Naval Education and Training Command

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Nonresident Training Course (NRTC)

Electronics Technician

Volume 6—Digital Data Systems

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this text.

ELECTRONICS TECHNICIAN—VOLUME 6

DIGITAL DATA SYSTEMS

NAVEDTRA 82416-A

Prepared by the Naval Education and Training Professional
Development and Technology Center (NETPDTC), Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the associated text or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The text for this course is *Electronics Technician—Volume 6, Digital Data Systems*, NAVEDTRA 12416-A. The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS: After studying the associated text, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the text. You may refer freely to the text and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

ANSWER SHEETS: You must use answer sheets designed for this course (NETPMSA Form 1430/5, Stock Ordering Number 0502-LP-216-0100). Use the answer sheets provided by Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet.

SUBMITTING COMPLETED ANSWER SHEETS: As a minimum, you should complete at least one assignment per month. Failure to meet this requirement could result in disenrollment from the course. As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time.

GRADING: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, your ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

COURSE COMPLETION: After you have submitted all the answer sheets and have earned at least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

NAVAL RESERVE RETIREMENT CREDIT: If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is divided into two units evaluated at 21 points.

Unit 1: 12 points upon satisfactory completion of Assignments 1 through 8.

Unit 2: 9 points upon satisfactory completion of Assignments 9 through 14.

(Refer to BUPERSINST 1001.39 for more information about retirement points.)

STUDENT QUESTIONS: If you have questions concerning the administration of this course, consult your ESO. If you have questions on course content, you may contact NETPDTC at:

DSN: 922-1546
Commercial: (904) 452-1546
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COURSE OBJECTIVES: In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following broad topics: fundamentals and operations of computers, computer configurations and hardware, computer operator controls and controlling units, computer components and circuits, central processing units and buses, computer memories, input/output (I/O) and interfacing, computer instructions and man/machine interfaces, magnetic tape storage, magnetic disk storage, CD-ROM storage, printers, data conversion devices, and switchboards.

Naval courses may include several types of questions--multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material. upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses useall of the types of questions available. You can readily identify the type of each question, and the action required, by reviewing of the samples given below.

MULTIPLE-CHOICE QUESTIONS

Each question contains several alternative answers, one of which is the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-l. The first U.S. Navy nuclear-powered vessel was what type of ship?

1. Carrier
2. Submarine
3. Destroyer
4. Cruiser

Indicate in this way on your answer sheet:

	1	2	3	4	
	T	F			
s-1	☐	■	☐	☐	___

TRUE-FALSE QUESTIONS

Mark each statement true or false as indicated below. If any part of the statement is false, the entire statement is false. Make your decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. Shock will never be serious enough to cause death.

1. True
2. False

Indicate in this way on your answer sheet:

	1	2	3	4	
	T	F			
s-2	☐	■	☐	☐	___

MATCHING QUESTIONS

Each set of questions consists of two columns, each listing words, phrases or sentences. Your task is to select the item in column B which is the best match for the item in column A. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on your answer sheet.

SAMPLE

In answering questions s-3 through s-6, SELECT from column B the department where the shipboard officer in column A functions. Responses may be used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Department
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	4. Navigation Department

Indicate in this way on your answer sheet:

	1	2	3	4	
	T	F			
s-3	☐	■	☐	☐	___
s-4	■	☐	☐	☐	___
s-5	☐	☐	■	☐	___
s-6	■	☐	☐	☐	___

ASSIGNMENT 1

Textbook Assignment: "Fundamentals and Operations of Computers," chapter 1, pages 1-1 through 1-17; "Computer Configurations and Hardware," chapter 2, pages 2-1 through 2-12.

1-1. All computers have which of the following components in common?

1. Modem, memory, and floppy drives
2. Math coprocessor, microchips, and central processing unit
3. Central processing unit, memory, and input/output section
4. Analog processing unit, input/ output section, and microchips

1-2. The amount of computing power a computer has is determined by which of the following factors?

1. Physical size
2. Size of drives
3. Number of drives
4. Technology used

1-3. All computers must be capable of which of the following functions?

1. Processing and storing data
2. Retaining data on compact disks
3. Interfacing with mainframe computers
4. Interfacing with desktop publishing equipment

1-4. Computers can gather data by which of the following methods?

1. Manually only
2. Automatically only
3. Both manually and automatically
4. Local-area networks

1-5. A computer automatically gathers data by which of the following means?

1. From another system, subsystem, or equipment
2. From specific software
3. By a local terminal user
4. By a remote terminal user

1-6. Which of the following tasks is the main purpose of a computer?

1. Storing data
2. Gathering data
3. Processing data
4. Disseminating data

1-7. Computers can externally store data on which of the following types of media?

1. Magnetic disks only
2. Magnetic tape only
3. Paper tape only
4. Magnetic disks, magnetic tape, and paper tape

1-8. Computers can disseminate data to which of the following types of equipment?

1. A display subsystem only
2. A magnetic tape or disk unit only
3. A printer only
4. A display subsystem, magnetic tape or disk unit, and a printer

1-9. Computer systems display which of the following general types of data/information?

1 Hardware performance information only
2 Data related to the system's mission only
3 Status information related to the system's operation only
4. Data related to the system's mission and status information related to the system's operation, and hardware performance information

1-10. In addition to display units, a computer relies on what other equipment to display processed data?

1. Floppy disks
2. Processors
3. Printers
4. Modems

1-11. What are the three general types of computers?

1 Mini, macro, and laptop
2 Personal, mini, and macro
3 Mainframe, mini, and micro
4 Technological, mainframe, and desktop

1-12. The mainframe computers you will maintain in the Navy are categorized by which of the following terms?

1. Word processing
2. General purpose
3. Specialized
4. Graphical

1-13. The Navy adapts a specific program to fit its needs and does not deviate once this program is installed into the computer.

1. True
2. False

1-14. What type of computer is housed in a large, rugged frame or cabinet?

1. Minicomputer
2. Microcomputer
3. Microcomputer
4. Mainframe computer

1-15. What types of computers use operator console and maintenance console panel/display control units to perform maintenance?

1. Mainframe computers
2. Microcomputers and minicomputers
3. Minicomputers and microcomputers
4. Microcomputers and local-area network computers

1-16. Although a computer maybe used for many types of operations, which of the following computers are considered the heart of the tactical and tactical support data systems?

1. Minicomputers
2. Microcomputers
3. Mainframe computers
4. Minicomputers or microcomputers, depending on the system

1-17. The SNAP I and II systems use as their host computers which of the following equipment?

1. Minicomputers
2. Microcomputers
3. Mainframe computers
4. Local-area network computers

1-18. Some of the newer microcomputers maybe even more powerful than older, larger mainframe computers.

1. True
2. False

1-19. What type of computer has the CPU contained on a single integrated chip?

1. Microcomputer
2. Macrocomputer
3. Minicomputer
4. Mainframe computer

1-20. Which of the following elements is generally considered an optional equipment for microcomputers?

1. Display monitor
2. Keyboard
3. Printer
4. Modem

1-21. Training for which of the following types of computers is NOT NEC producing?

1. Minicomputer
2. Microcomputer
3. Mainframe computer
4. Macrocomputer

1-22. What is the heart of every data system?

1. Software
2. Operator
3. Computer
4. Peripherals

1-23. How do computer systems exchange data?

1. Through local-area networks
2. Through transfer of software
3. Through a knowledgeable and competent operator
4. Through a series of interrupts, requests, and acknowledges

1-24. Which of the following types of data do computers exchange?

1. Data words only
2. Status signals only
3. Control signals only
4. Data words, status signals, and control signals

1-25. How is interfacing between computers and peripherals accomplished?

1. Cables and connectors
2. Electronic emissions
3. Output devices
4. External disk drives

1-26. What are the three operational uses of computers by the Navy?

1. Graphical, database, and tactical
2. Nontactical, tactical, and tactical support
3. Tactical support, graphical, and database
4. Word processing, tactical support, and nontactical

1-27. The number of computers used in a tactical data system depends on which of the following factors?

1. Size of ship
2. Class of ship
3. Mission of ship
4. Length of ship deployment

1-28. Tactical support platforms include a variety of systems and normally use which of the following types of computers in their operations?

1. Minicomputers only
2. Microcomputers only
3. Mainframe computers only
4. Microcomputers and mainframe computers

1-29. ASW systems use what means as the central point of operation?

1. A single computer only
2. A data processing subsystem
3. A video processing subsystem
4. Multiple computers

1-30. In a JMCIS system, informational data is provided to designated flagships for what purpose?

1. Logistical inventories
2. Flight orders of shipboard planes
3. Mobilization and documentation of personnel
4. Battle management of tactical situations

1-31. In the JMCIS system, how do desktop computers in the data processing and video processing subsystems communicate?

1. By coaxial cable
2. By fiber-optic LANs
3. By disk exchange
4. By modems

1-32. The naval intelligence processing system uses which of the following types of specially modified computers in a LAN configuration as its operational computers?

1. Unisys 44
2. Unisys 101
3. Zenith 150
4. DTC/TAC-n personal computers

1-33. The naval intelligence processing system uses which of the following operating systems?

1. OS-2 and UNIX
2. OS-2 and MS-DOS
3. MS-DOS@ and UNIX™
4. DR-DOS and INIX

NOTE: MS-DOS is a registered trademark of Microsoft Corporation. UNIX is a trademark of AT&T.

1-34. Nontactical systems normally use which of the following types of computers?

1. Minicomputers and microcomputers
2. Mainframes and minicomputers
3. Microcomputers and mainframes
4. Desktop and mainframes

1-35. What are BASIC, FORTRAN, COBOL, PASCAL, and C?

1. Computer programs
2. Computer languages
3. Computer processing units
4. Computer operating systems

1-36. On a LAN, personal computers can share which of the following resources?

1. Software only
2. Data files only
3. Data files and peripherals only
4. Data files, peripherals, and software

1-37. The type and number of computers that make up a system have a direct bearing on which of the following elements?

1. Hardware and software
2. Configuration and setup
3. Operating system and location
4. Number of operators and types of software

1-38. Hardware setup includes what three things?

1. Physical design, ease of maintenance, and operator controls
2. Operator controls, external controls, and physical design
3. External controls, ease of maintenance, and physical design
4. Maintenance availability, operator controls, and external controls

1-39. In software setup, what must you specify to the software?

1. The resources to use
2. The number of operators
3. The climate of the location
4. The purpose of the software

1-40. Your involvement with software is directly dependent on which of the following factors?

1. Type of mission
2. Type of computer
3. Type of peripherals
4. Type of organization

1-41. Who designs the software for mainframes used in tactical and tactical support applications?

1. Outside support activities
2. Commercial software designers
3. Shipboard computer programmers
4. MOTUS

1-42. When configuring and setting up software for a microcomputer, you must keep in mind which of the following factors?

1. You must know how to correct operational program discrepancies
2. You must use only software that was designed by an outside support activity
3. The computer system must be connected to the nearest mainframe computer
4. The operating system must be customized to the hardware of the computer system

1-43. When using applications software with your microcomputer, you must ensure that the software is compatible with which of the following elements?

1. Coprocessor
2. Operating system
3. Memory unit
4. Mainframe computers

1-44. When the computer is online, which of the following factors cause it to function correctly?

1. Software
2. Peripherals
3. RAM capacity
4. Modems

1-45. In the offline mode of operation, a computer is limited to performing which of the following operations?

1. Tactical
2. Nontactical
3. Maintenance
4. Tactical support

1-46. The battle short mode of operation is used when the computer must run continuously under which of the following conditions?

1. When loading software
2. When performing maintenance
3. When an overtemperature condition exists
4. When an under-temperature condition exists

1-47. An overtemperature condition can be a result of which of the following conditions?

1. Too many software programs loaded into ROM
2. A failed assembly situation only
3. An inadequate cooling condition only
4. Either a failed assembly situation or an inadequate cooling situation

1-48. The operational capabilities and limitations of a computer system can be controlled by all except which of the following devices?

2. Telephone hookups
3. Software commands
4. Control panels

1-49. To reconfigure a computer system to a reduced capability, which of the following devices can be used?

1. Peripherals only
2. Switchboards only
3. Control panels only
4. Switchboards, control panels, and I/O devices

1-50. A computer's effective operation and security may be seriously jeopardized by which of the following factors?

1. Electromagnetic interference and lack of ADP security
2. Electromagnetic interference and physical location of equipment
3. Operator knowledge of mission and lack of ADP security
4. Both 2 and 3 above

1-51. The Navy ensures that only authorized users gain access to computer nontactical systems (SNAP) by which of the following means?

1. Locking the computer when it is not in authorized use
2. Authorizing the use of only certain software
3. Storing the software in a secure place
4. Using passwords to identify authorized users

1-52. To learn more about computer security, which of the following instructions should you study?

1. OPNAVINST 5239.1 only
2. OPNAVINST 5510.1 only
3. Both OPNAVINSTS 5239.1 and 5510.1
4. MIL-STD-1355

1-53. What type of electromagnetic interference (EMI) causes the majority of EMI problems in digital data equipment?

1. Narrowband
2. Broadband
3. Inherent
4. Natural

1-54. Aboard ship, which of the following conditions does NOT have a significant effect in EMI?

1. Grounding of equipment
2. Interconnecting cables
3. Location of equipment
4. Software in use

1-55. At a shore-based installation, control of EMI involves the same factors as a shipboard computer system, but with the addition of which of the following other considerations?

1. Terminal operators
2. Site location only
3. Soil quality only
4. Both site location and soil quality

1-56. To assist in avoiding or reducing the effects of EMI, you may find guidelines for the proper construction of bonding straps and grounding cables in which of the following publications?

1. OPNAVINST 5510.1
2. NAVSEA OP 3556
3. NAVSEA S9507
4. MIL-STD 1310

1-57. The fictional units of a computer are always consistent regardless of the computer's type.

1. True
2. False

1-58. To obtain the most reliable and effective instructions for maintaining a computer, you should refer to which of the following current references?

1. OPNAVINST 5239.1
2. SECNAVINST 5230.7
3. The computer's technical manual
4. Local instructions

1-59. A computer's fictional block diagram should provide you with all of the following information except which one?

1. Operational principles
2. Software compatibility
3. Signal types and flows
4. Major functional areas.

1-60. What are the three major functional areas of a computer?

1. CPU, I/O, and modem
2. Memory, I/O, and CPU
3. Hard disk, modem, and memory
4. Monitor, memory, and hard disk

1-61. The physical layout diagram gives you a picture of all of the following locations or types of computer elements except which one?

1. Module
2. Console
3. Assembly
4. Signal flow

1-62. What are the four types of physical layouts for computers?

1. Backplane, assembly, cage, and LAN
2. Cage, motherboard, modular, and desktop
3. Assembly, rack, backplane, and modular
4. Chassis, motherboard, mainframe, and desktop

1-63. For modular data systems that use multiple configurations, both minimum and fill physical layout configurations will be shown on a physical layout.

1. True
2. False

1-64. In a chassis or assembly type computer, which of the following methods is/are usually used to mount the chassis or assembly?

1. Door mounted only
2. Slide mounted only
3. Both door and slide mounted
4. Backplane mounted

1-65. A cage or rack type computer's major functional areas are always contained on one pcb.

1. True
2. False

1-66. Computers that use motherboards usually have a total of how many backplanes or motherboards to contain assemblies and pcb's?

1. One
2. Two
3. Three
4. Four

1-67. What layout gives you information on subassemblies or printed circuit boards in each assembly, chassis, or module?

1. Overall physical layout
2. Overall fictional layout
3. Individual physical layout
4. Individual fictional layout

1-68. You do not have a need for an individual physical layout diagram in which of the following situations?

1. When you have the overall physical layout diagram
2. When you have the overall functional layout diagram
3. When you have the repair memorized
4. When you never repair the unit

1-69. The configuration of a particular computer is normally dictated by which of the following criteria?

1. Type of computer and data system platform
2. Available power supply and programming needs
3. Data system platform and projected use of computer
4. Type of computer and anticipated software installation

1-70. A computer's frame usually contains which of the following hardware?

1. The computer only
2. The power supply only
3. The computer and the power supply only
4. The computer, power supply, and cooling hardware

1-71. When compared to other types of computer cabinets, what is the largest single advantage of modular frames in addition to mobility?

1. Ruggedness
2. Adaptability
3. Ease of installation
4. Access to control panels

1-72. Pcb's are arranged in which of the following ways inside a chassis?

1. In close proximity and in square blocks
2. In close proximity and in rows
3. Spread out and in rows
4. Spread out and on opposite sides of the cabinet

1-73. Motherboard-designed computers have which of the following features as their primary design feature?

1. Portability
2. Ruggedness
3. Shipboard use
4. Tactical use

1-74. It is easier to maintain computers that have motherboards for which of the follow reasons?

1. The cabinet need not be removed
2. The power need not be secured
3. The computer's small size and ease of component accessibility
4. All of the above

1-75. What two features used in or on a cabinet provide limited protection for a computer?

1. Gaskets and filters
2. Surge protectors and shock reducers
3. Insulating material and grounding wires
4. External power source and RF interference adapters

ASSIGNMENT 2

Textbook Assignment: "Computer Configuration and Hardware," chapter 2—continued, pages 2-13 to 2-27; "Computer Operator Controls and Controlling Units," pages 3-1 through 3-15.

2-1. How do manufacturers key subassemblies to avoid incorrect installation?

1. They tag the subassembly with the connect location
2. They write the location on the part with indelible ink
3. They make the designation very clear in the technical manual
4. They cut a slot in the side of the pcb or put plastic sheeting on one or more connector pins

2-2. All subassemblies are repairable at the work station.

1. True
2. False

2-3. The majority of a computer's functional areas consists of which of the following components?

1. Motherboards
2. Power drivers
3. Random access memories
4. Printed circuit boards

2-4. What factor determines the number of printed circuit boards required for a particular computer?

1. Type of computer
2. Portability of computer
3. Accessibility of one computer to another computer
4. Danger of electronic emissions near the work station

2-5. The arrangement of pcb's in a computer is dictated by which of the following factors?

1. Type of computer
2. Purpose of the computer
3. Location of the computer
4. Software programs to be used

2-6. Keying pcb's is done for which of the following reasons?

1. To ensure that the pcb is inserted correctly only
2. To ensure that a different card type is not inserted into an incorrect slot only
3. To ensure that the pcb is inserted correctly and to ensure that a different card type is not inserted into an incorrect slot
4. To facilitate ease of location in an emergency situation

2-7. You should know the color codes of pcb's. You will find these color codes explained in which of the following publications?

1. NEETS, Module 3
2. NEETS, Module 4
3. NEETS, Module 19
4. NEETS, Module 21

2-8. LEDs are used for which of the following maintenance functions on pcb's?

1. To test voltage levels
2. To test waveforms
3. To tell when equipment is operating abnormally
4. Each of the above

2-9. Which of the following publications provides a listing for standard external interfaces?

1. MIL-STD-2000
2. MIL-STD-2036
3. NEETS, Module 4
4. NEETS, Module 24

2-10. Which of the following documents provide(s) maintenance information on connectors and cables?

1. Computer technical manuals
2. EIMB, Installation Standards, NAVSEA0967-LP-000-0110
3. Both 1 and 2 above
4. MIL-STD-2036

2-11. Connector receptacles are also known as what?

1. Printed circuit boards
2. Subassemblies
3. Modules
4. Jacks

2-12. Mating of a connection only includes electrical pins and contacts or pcb card-edge.

1. True
2. False

2-13. A rectangular connector's electrical contacts or pins may have which of the following characteristics?

1. Be male or female, flat or oval
2. Be male or female, round or flat
3. Be male or female, round or oval
4. Be oval, round, or rectangular

A. Single-piece pcb or card edge
B. Two-piece plug and receptacle pcb
C. Rectangular multipin
D. Circular multipin
E. Coaxial

Figure 2A.—Connector architecture.

IN ANSWERING QUESTIONS 2-14 THROUGH 2-19, SELECT FROM FIGURE 2A THE TYPE OF CONNECTOR ARCHITECTURE DESCRIBED IN THE QUESTION.

2-14. Which item can contain more than 100 pins and contacts?

1. A
2. B
3. C
4. E

2-15. MTIDC or IDC are included in all except which of the following connectors?

1. A
2. B
3. C
4. F

2-16. Telephone jacks connectors can be used to connect a conductor to which connector?

1. A
2. C
3. D
4. F

2-17. Contacts or pins on plugs or receptacles are male or female except on which of the following connectors?

1. B
2. C
3. D
4. F

2-18. Provisions for shielding against shock and vibration can be on all except which of the following connectors?

1. A
2. C
3. D
4. E

2-19. Hardware is used to secure which of the following connections and provide stability against shock and vibration?

1. C
2. D
3. E
4. F

2-20. Internal connectors are used inside the computer for which of the following reasons?

1. To connect the computer to a display system
2. To provide power to the computer only
3. To interconnect major individual units inside the computer only
4. To interconnect major individual units inside the computer and provide power to the computer

2-21. What precaution should you use when making connections for pcb's, modules, or subassemblies?

1. Secure the power to the computer and ensure the receptacle and plug match
2. Ensure that the receptacle or plug has guide pins
3. Force the connection
4. Both 2 and 3 above

2-22. Which of the following documents can be used to find the signal names used by a computer?

1. The wire listings only
2. The computer's prints only
3. The description of a pcb only
4. The computer's wire listings, prints, and/or a description of each pcb

2-23. Internal conductors can only take mass data and route it for distribution throughout the computer.

1. True
2. False

2-24. To make effective use of limited space, what item is used to neatly organize conductor bundles internally?

1. Lacings
2. Spot ties
3. Wiring harnesses
4. Self-cliching straps

2-25. To secure the wires contained in a wire harness, which of the following items may be used?

1. Lacings only
2. Spot tying only
3. Self-clinching straps only
4. Lacings, spot tying, and self-clinching straps

2-26. If a conductor is partially replaced or completely replaced, a different grade (AWG) and type of conductor can be used.

1. True
2. False

2-27. In addition to securing power to the computer, what other precaution, if any, should be exercised when you are disconnecting and reconnecting power and data connections?

1. Follow the proper tag-out procedures
2. Document your actions in the computer room pass down log
3. Back up the data to a floppy or hard drive
4. None; no precautions are needed

2-28. The power requirements for all computers are identical regardless of where the computers are used.

1. True
2. False

2-29. To help mate connector receptacles and plugs properly, which of the following methods may be used?

1. Keying only
2. Physical shape only
3. Keying and physical shape

A. Flat
B. Ribbon
C. Twisted component or multiconductor
D. Coaxial
E. Fiber optic

Figure 2B.—Cable architecture.

IN ANSWERING QUESTIONS 2-30 THROUGH 2-34, SELECT FROM FIGURE 2B THE TYPE OF CABLE ARCHITECTURE THAT BEST MATCHES THE DESCRIPTION IN EACH QUESTION.

2-30. Conductors are separated by the dielectric core.

1. A
2. B
3. C
4. D

2-31. Can be terminated with card-edge connectors or IDCs.

1. B
2. C
3. D
4. E

2-32. Can have up to 120 conductors.

1. A
2. B
3. C
4. D

2-33. Capable of transmitting a 20-Mhz signal with minimum loss and no distortion.

1. A
2. B
3. C
4. D

2-34. Used for serial transfer of data only.

1. D only
2. E only
3. Dand E
4. A, B, and C

2-35. What is the most critical piece of equipment in any data system?

1. Memory
2. Computer
3. Connector
4. Disk drive

2-36. In cooling systems, what four methods of cooling are used?

1. Convection, forced air, air-to-air, and air-to-liquid
2. Forced air, air-to-air, microwaved, and convection
3. Air-to-liquid, air-to-air, microwaved, and forced air
4. Air-to-air, forced air, external fan-blown, and convection

2-37. What type of operator control is used to alter the speed of an internal computer clock or vary the intensity of indicators?

1. Thumbwheel switch
2. Potentiometer
3. Pushbutton
4. Mouse

2-38. To provide status information to the computer operator, which of the following devices may be used?

1. Dot matrix display only
2. Light-emitting diodes only
3. Dot matrix display and light-emitting diodes
4. Mouse devices

2-39. What is the simplest way to show the status of an operation or the selection of an item?

1. Send a message to a printer
2. Send a message to disk
3. Turn on a light
4. Sound an alarm

2-40. All of the following are types of indicators except which one?

1. Backlit
2. Opaque
3. Clear
4. Color

2-41. Protective devices can serve as controls.

1. True
2. False

2-42. To protect from accidental activation of selected keys and switches, what device is used with selected keys and switches?

1. Horn
2. Guard
3. Circuit breaker
4. Light-emitting diode

2-43. Switches have which of the following functions?

1. To activate a function
2. To turn a unit on/off
3. To set a parameter
4. Each of the above

2-44. A key switch you depress to activate a function and depress again to deactivate the function is called a/an

1. momentary-action key switch
2. alternate-action key switch
3. three-position key switch
4. on/off key switch

2-45. A key that repeats the fiction continuously while being held down is which of the following types of keys?

1. Momentary-action key
2. Alternate-action key
3. Toggle key
4. On/off key

2-46. Switches that have several positions the operator can select by turning a knob are which of the following types of switches?

1. Rotary switches
2. Pushbutton switches
3. Alternate-action toggle switches
4. Momentary-action toggle switches

2-47. All of the following are characteristics of thumbwheel switches except which one?

1. They have alphanumeric characters built in
2. Each position is locked until another position is selected
3. The position values are usually marked on the controlling unit cover
4. The positions are selected by dialing the switch

2-48. Pushbutton switches may not have indicators.

1. True
2. False

2-49. On toggle switches, which of the following can be uses of the neutral position?

1. Interact with software
2. Set a parameter
3. Disable a locked up/down position
4. Each of the above

2-50. Alternate-action toggle switches may have which of the following positions?

1. Permanent up and return to neutral only
2. Permanent up and down only
3. Either permanent up and return to neutral or permanent up and down, depending on design
4. On and off

2-51. Momentary-action/contact, two-position toggle switches are normally used for which of the following purposes?

1. To turn the unit on
2. To initiate an operation
3. To provide status information
4. To turn the unit off

2-52. On a three-position toggle switch, the center position may be used for which of the following purposes?

1. To set a parameter only
2. To disable the locked up/down position only
3. Either to set a parameter or to disable the locked up/down position, depending on the function
4. To provide status information

2-53. You should expect to find all of the following types of information about controlling units in the technical manuals and owner's manuals of your system except which one?

1. General description of the unit
2. Tables and figures to describe each control and indicator
3. Circuit diagrams with information for maintenance
4. Manufacturing specifications and design requirements

2-54. In addition to operational programs, what other type of programs will you be using to perform preventive maintenance?

1. Diagnostic programs
2. Applications programs
3. Word processing programs
4. Database management programs

2-55. Information about each control and indicator will include all except which of the following information?

1. Name
2. Type
3. Date installed
4. Function and use

2-56. In addition to providing power indicators, which of the following other important functions do power/temperature panels provide?

1. Notify you of an overtemperature condition
2. Enable you to modify the temperature setting for efficient operation
3. Both 2 and 3 above
4. Shut down the system automatically when an overtemperature condition is reached

2-57. From the operator panel you can perform all of the following functions except which one?

1. Initiate computer operations
2. Monitor computer operations
3. Put the computer in battle short condition
4. Power up/down individual designated modules

2-58. Built-in test (BIT) controls and indicators are included on which of the following panels?

1. Operator panel
2. Power/temperature panel
3. Control and maintenance panel
4. Each of the above

2-59. During operation and maintenance, all of the following are computer monitoring capabilities from a control and maintenance panel (CMP) except which one?

1. Software availability
2. Hardware availability
3. Switch settings
4. Jump stops

2-60. The ac plasma part of a display control unit has which of the following functions?

1. Provides you operational information
2. Provides you corrective maintenance information
3. Interfaces with the CPU/IOC and memory
4. Both 2 and 3 above

2-61. A built-in microprocessor with five levels of controls and indications for loading and initiating operations, monitoring operations, status indications, operator interfacing, and self-testing is part of what type of controlling unit?

1. Maintenance console unit
2. Computer control panel
3. Display control unit
4. Operator panel

2-62. To perform diagnostics on a computer, what type of controlling unit enables you to use a data terminal and diagnostics stored on a magnetic tape?

1. Operator panel
2. Maintenance console
3. Display control unit
4. Computer control panel

2-63. From a computer control panel, you can perform which of the following types of monitoring?

1. Operational program status only
2. Display registers only
3. Switch settings only
4. Switch settings, display registers, and computer operations

2-64. What controlling unit enables you to operate the computer set under expanded and varied conditions, at various operating speeds, and in various operating modes?

1. Operator panel
2. Maintenance console
3. Power/temperature panel
4. Computer control unit

2-65. When you manually interface with the CPU and IOC for software enhancement, what is the name of the function you are performing?

1. Diagnostic programming
2. Operator programming
3. Inspect and change
4. Casualty control

2-66. A keyboard will be your primary device for controlling what type of computer, if any?

1. Mainframe
2. Minicomputer
3. Microcomputer
4. None; keyboards are not used to control computers

2-67. On a microcomputer, what is the primary method used to provide information to you?

1. Printer
2. Monitor
3. Light-emitting diodes
4. Indicator lights on the keyboard

2-68. The meanings of function keys and control keys can be assigned in which of the following ways?

1. By the computer hardware manufacturer only
2. By the computer program only
3. By the operating system only
4. By both the computer program and the operating system

2-69. In addition to the keyboard, what other device may you use as a controlling device with the monitor to control the operations of a microcomputer?

1. Mouse
2. Key switch
3. Rotary switch
4. Toggle switch

2-70. Of the following devices, which one can provide both input to a computer and output from a computer?

1. Mouse
2. Printer
3. Teletype
4. Keyboard

2-71. A teletype is composed of which of the following components?

1. Printer only
2. Keyboard only
3. Printer and keyboard only
4. Printer, keyboard, and monitor

2-72. From remote consoles and remote operator control units, you may be able to perform all except which of the following functions?

1. Power the computer set up/down
2. Initiate computer operations
3. Monitor computer status
4. Perform self-testing

ASSIGNMENT 3

Textbook Assignment: "Computer Components and Circuits," chapter 4, pages 4-1 through 4-23.

3-1. A computer has a total of how many states in its binary system?

1. One only
2. Two only
3. Three only
4. Four

3-2. The digital functions and operations of a computer are based upon what mathematical concept?

1. Calculus
2. Trigonometry
3. Logic algebra
4. Plane geometry

3-3. You have been assigned to maintain a set of computers. What must you understand about the computers to successfully accomplish your assignment?

1. What comprises the computer's components
2. How the components makeup the computer's fictional areas
3. How to determine if a particular component is malfunctioning
4. All of the above

3-4. On input data, a computer performs which of the following types of general functions?

1. Calculus only
2. Geometric only
3. Trigonometric and geometric only
4. Arithmetic and logical

3-5. What basis is used to determine the logic circuits to be used in a particular computer?

1. The computer's requirements
2. The skills of the operator
3. The computer's location
4. The soffware to be used

3-6. Which publication lists standard microcircuits?

1. NEETS, Module 7
2. NEETS, Module 14
3. ANSI/IEEE 91-1984
4. MIL-STD-1562

3-7. Which of the following publications discusses Boolean algebra?

1. NEETS, Module 9
2. NEETS, Module 13
3. NEETS, Module 19
4. MIL-M-38510

3-8. To study wave-generation, you should refer to which of the following publications?

1. NEETS, Module 9
2. NEETS, Module 19
3. ANSI/IEEE 91-1984
4. ANSI/IEEE 991-198

3-9. Standard graphic symbols for logic functions are found in which of the following publications?

1. NEETS, Module 7
2. NEETS, Module 14
3. ANSI/IEEE 91-1984
4. MIL-M-38510

3-10. The octal and hexadecimal number systems are the most popular derivatives used today by digital computers. From what number system are they derived?

1. Roman
2. Arabic
3. Decimal
4. Binary

IN ANSWERING QUESTIONS 3-11 AND 3-12, REFER TO FIGURE 4-1 ON PAGE 4-3 IN THE TRAMAN.

3-11. The octal number 14 is what in (a) decimal, (b) binary, and (c) hexadecimal?

1. (a) 12 (b) 01110 (c) 14
2. (a) 12 (b) 01100 (c) C
3. (a) 14 (b) 01100 (c) 14
4. (a) 14 (b) 01110 (c) E

3-12. The decimal number 16 is what in (a) binary, (b) octal, and (c) hexadecimal?

1. (a) 1000 (b) 18 (c) F
2. (a) 1000 (b) 20 (c) 10
3. (a) 10000 (b) 16 (c) 16
4. (a) 10000 (b) 20 (c) 10

3-13. In Boolean algebra, what are the two logic levels?

1. 1 and 0
2. 1 and 2
3. 2 and 0
4. 2 and 3

3-14. Which of the following combinations represents the three basic logic gates used in building the combinational and sequential digital logic circuits?

1. OR, BUT, ALSO
2. AND, OR, NOT
3. NOT, NEITHER, NOR
4. AND, BUT, OR

3-15. Modern computers rely on what type of circuits?

1. Balanced
2. Monophase
3. Integrated
4. Multipoint

3-16. Integrated circuits provide what three major advantages?

1. High reliability, low cost, and accessibility
2. Low cost, small size, and high reliability
3. Portability, accessibility, and reliability
4. Small size, low cost, and portability

3-17. For which of the following reasons are integrated circuits packaged in various sizes?

1. Number of leads
2. Color coding
3. Size of chip
4. Key coding

3-18. What scale of integration has 10 to 100 gates?

1. Small scale
2. Medium scale
3. Large scale
4. Very large scale

3-19. What factor determines the integration size of an integrated circuit package?

1. The number of chips
2. The types of leads
3. The number of gates
4. The types of keying

3-20. Integrated circuits that combine the technology of bipolar and metal-oxide semiconductors are referred to as what type of circuit?

1. Unipolar
2. Bipolar
3. BIMOS
4. MOS

3-21. Most of a computer's integrated circuits are digital.

1. True
2. False

3-22. To process and store information in a computer's memory, what category of circuit is used?

1. MOS only
2. Bipolar only
3. Digital
4. Linear

3-23. Bipolar integrated circuits include all of the following components except which one?

1. ECL
2. ALS
3. TTL
4. TTLC

3-24. Which of the following components is NOT a part of a MOS integrated circuit?

1. DTL
2. TTLC
3. CMOS
4. HCMOS

3-25. In the determination of whether a computer's logic level is negative or positive, what is the relationship of the two voltages?

1. They are relative to each other
2. They are independent of each other
3. They intermesh with each other
4. One is dominant; the other subordinate

IN ANSWERING QUESTIONS 3-26 THROUGH 3-28, SELECT FROM THE FOLLOWING LIST THE TERM DESCRIBED IN EACH QUESTION.

1. Pulse width
2. Pulse-repetition time
3. Pulse-duration modulation
4. Pulse-repetition frequency

3-26. The time period from a repeating waveshape's starting point until the next starting point.

3-27. The time interval between specified reference points on the leading and trailing edges of a waveform.

3-28. The number of times per second that a signal's complete cycle occurs.

GIVEN: A DIGITAL WAVESHAPE HAS A PRT OF 25 µsec AND A NEGATIVE PW OF 15 µsec.

Figure 3A.—Example statement.

IN ANSWERING QUESTIONS 3-29 AND 3-30, REFER TO FIGURE 3A.

3-29. What is the value of the positive PW?

1. 6 µsec
2. 8 µsec
3. 10 µsec
4. 12µsec

3-30. What is the value of the PRF?

1. 37 kHz
2. 40 kHz
3. 43.5 kHz
4. 47.5 kHz

3-31. What is the basic building block for combinational digital circuits?

1. Diodes
2. Capacitors
3. Flip-flops
4. Logic gates

3-32. What is the basic building block for sequential circuits?

1. Resistors
2. Conductors
3. Flip-flops
4. Logic gates

3-33. Logic gates perform decision-making functions throughout the computer.

1. True
2. False

3-34. Which of the following is another term for flip-flops?

1. Unistable multivibrators only
2. Bistable multivibrators only
3. Tristable multivibrators only
4. Multivibrators

3-35. What are the four types of flip-flops?

1. J-K, set, open, closed
2. Toggle, data, reset-set, J-K
3. Reset-set, data, continuous, open
4. Open, continuous, closed, toggle

3-36. Decision-making functions are composed primarily of which of the following components?

1. Combinational gates
2. Bistable multivibrators
3. Sequential digital circuits
4. Independent linear circuits

A. Adder and subtracter circuits
B. Command signal circuits
C. Comparator circuits
D. Demultiplexer circuits
E. Selector circuits
F. Translator circuits

Figure 3B.—Data routing circuits.

IN ANSWERING QUESTIONS 3-37 THROUGH 3-44, SELECT FROM FIGURE 3-B THE DATA ROUTING CIRCUIT DESCRIBED IN THE QUESTION.

3-37. Which circuits provide the enable to route data between circuits?

1. A
2. B
3. E
l F

3-38. Which circuits are used with shift registers and holding registers to perform hyperbolic and trigonometric functions?

1. A
2. B
3. C
4. D

3-39. Which circuits can change machine octal codes into function codes?

1. C
2. D
3. E
4. F

3-40. Which circuits expand the number of input data paths to a register?

1. A
2. C
3. E
4. F

3-41. Which circuits are capable of performing square root when used with shift and holding registers?

1. A
2. C
3. D
4. F

3-42. Which circuits can select an address?

1. B
2. D
3. E
4. F

3-43. Which circuits can be used to compare incoming binary numbers after mathematical operations have been performed?

1. B
2. C
3. D
4. F

3-44. Which circuits route data from one input to any one of several outputs?

1. A
2. D
3. E
4. F

3-45. Memory-type functions are accomplished by what type of circuit?

1. Linear
2. Bipolar
3. Sequential
4. Combinational

3-46. Counters can only be used in parallel operations.

1. True
2. False

3-47. Counters are used for which of the following functions?

1. For counting operations and quantities only
2. For counting periods of time only
3. For addressing information in storage only
4. For counting operations, quantities, and periods of time; and for addressing information in storage

3-48. What items constitute a register?

1. Numbers of circuits
2. Groups of flip-flops
3. Numbers of logic gates
4. All of the above

3-49. The length of a register is determined by what factor?

1. The function it performs
2. The type of logic the computer uses
3. The number of bits (flip-flops) grouped together
4. The number system the computer uses: octal or hexadecimal

3-50. There are two types of registers most commonly used in computers. Which of the following terms refer to these registers?

1. Memory and backup
2. Storage and shift
3. Backup and memory
4. Storage and backup

3-51. What type of storage register, if any, does NOT alter the contents?

1. General
2. Specialized
3. Subject-specific
4. None; all storage registers can alter their contents

3-52. In what transfer method is the receiving register cleared of its contents before a transfer occurs?

1. Single-line parallel
2. Double-line parallel
3. Complement
4. Displaced

3-53. Of the following transfer methods used with registers, which one is the fastest?

1. Complement method
2. Displaced method
3. Direct method
4. Forced method

3-54. What register can handle information in serial and parallel form?

1. Complement
2. Storage
3. Backup
4. Shift

3-55. In linear circuits, the graph of output versus input approximates which of the following types of lines?

1. Wavy
2. Arced
3. Zigzag
4. Straight

3-56. DMOS and bipolar technology is known by what acronym?

1. BIFET
2. BIDFET
3. BIDMOS
4. MOSFET

3-57. The basic gate for a linear integrated circuit is a/an

1. operational amplifier
2. diffuser
3. catalyst
4. conductor

3-58. An inverting input of an op amp provides what degree of phase shift at the output?

1. 150
2. 180
3. 210
4. 315

3-59. All of the following types of circuits are part of a computer's linear integrated circuits except which one?

1. Digital circuits
2. Driver integrated circuits
3. Regulator integrated circuits
4. Analog signal conversion circuits

3-60. Which of the following circuits detect overtemperature conditions?

1. Timers
2. Analog converters
3. Digital converters
4. Comparators, voltage regulators, and switching regulators

3-61. Which of the following circuits can be used to produce an astable multivibrator?

1. Timers
2. Comparators
3. Switching regulators
4. Analog to digital converters

3-62. All of the following are classifications of systems interface circuits of a computer except which one?

1. Line drivers, receivers
2. Sense amplifiers, memory drivers
3. Peripheral and display drivers
4. Timers and analog-to-digital converters

3-63. Information is written into magnetic memories by which of the following drivers?

1. Line
2. Memory
3. Display
4. Peripheral

3-64. Display drivers use what type of input and output application?

1. Single
2. Dual
3. Trifold
4. Multiple

3-65. In the transmission of digital signals over short distances, which of the following types of line drivers and receivers are used?

1. Peripheral
2. Differential only
3. Single-ended only
4. Either differential or single-ended, depending on the design

3-66. For high-speed, long distance communications, which of the following types of drivers is/are used?

1. Single-ended only
2. Differential only
3. Both single-ended and differential
4. Basic wire cables

3-67. Timing circuits are used in a computer for which of the following reasons?

1. To keep track of calendar and clock times
2. To automatically make backup copies of data
3. To properly enable and disable circuits at specific times
4. To automatically disengage the computer if it becomes too hot

3-68. A program has been installed and the computer is operating. The enabling and disabling circuits will stop operating under each of the following conditions except which one?

1. Fault condition occurs
2. Programmed stop is reached
3. Program completion is reached
4. Instructions are executing

3-69. The master clock in a computer is the key to the computer's timing circuits. Master clocks usually operate at a frequency or pulse-repetition rate determined by which of the following factors?

1. The maximum speed of the operator
2. The minimum speed of the operator
3. The minimum rate the computer can handle data
4. The maximum rate the computer can handle data

3-70. In computer timing circuits, what is the most important reason for using oscillators?

1. Their output characteristics
2. Their frequency stability
3. Their phase processing
4. Their speed

IN ANSWERING QUESTIONS 3-71 THROUGH 3-74, SELECT FROM THE FOLLOWING LIST THE TYPE OF MULTIVIBRATOR DESCRIBED BY THE PHRASE IN EACH QUESTION.

1. Monostable
2. Bistable
3. Astable

3-71. The multivibrator that is also referred to as a one-shot multivibrator.

3-72. The multivibrator that counts clock pulses.

3-73. The multivibrator also known as a free-running multivibrator.

3-74. The multivibrator used to enable logic gates.

3-75. A single-phase clock system has what types of multivibrators?

1. Monostable and bistable
2. Bistable and astable
3. Monostable and astable
4. Astable and multistable

ASSIGNMENT 4

Textbook Assignment: "Computer Components and Circuits," chapter 4—continued, pages 4-24 through 4-3 1; "Central Processing Units and Buses," chapter 5, pages 5-1 through 5-10.

4-1. Which of the following are the types of data elements that can be processed by a computer?

1. Bits and bytes only
2. Bytes and single words only
3. Bits, bytes, and single words only
4. Nibbles, words, double words, bytes, and bits

4-2. What data element is normally the same size as the computer's registers?

1. Bit
2. Nibble
3. Word
4. Double word

4-3. What is the purpose of a computer's power supply?

1. To supply dc voltage
2. To convert ac voltage from a source to useable dc voltage(s)
3. To convert dc voltage(s) from a source to a useable ac voltage(s)
4. To supply ac voltage

4-4. Characteristics of a power supply include all of the following except which one?

1. Provide precision voltages
2. Protect the computer from serious damage
3. Supply regulated ac voltages
4. Sense irregular inputs and outputs

4-5. What are the major sections of a computer's power supply?

1. Amplifier, rectifier, filter, and regulator
2. Transformer, generator, filter, and regulator
3. Transformer, rectifier, filter, and regulator
4. Transformer, rectifier, filter, and transmitter

4-6. The computer can only handle one specified input voltage and frequency.

1. True
2. False

4-7. Aboard ship, distribution of computer input power is via which of the following means?

1. Outlets only
2. Load centers only
3. Power panels only
4. Outlets, load centers, and power panels

4-8. Mainframe and minicomputers aboard ship and ashore are preset to only receive the specific input line voltage needed.

1. True
2. False

4-9. Aboard ship, what document provides the specific voltage and frequency values as well as the location of your computer's power?

1. MIL-STD-1399
2. MIL-HDBK-411
3. Ship's electronics doctrine
4. MIL-HDBK-263

4-10. For referencing input power ashore, which of the following documents should you use?

1. MIL-STD-1399, Section 300A
2. MIL-STD-480
3. MIL-HDBK-411
4. Each of the above

4-11. For referencing input power aboard ship, which of the following documents should you use?

1. MIL-STD-1399, Section 300A
2. MIL-STD-480
3. MIL-HDBK-411
4. Each of the above

4-12. Where does the input line voltage go before it is received by the transformer section of the computer's power supply?

1. To the rectifier section
2. To the ON/OFF switch
3. To the blower fan
4. To the filter section

IN ANSWERING QUESTIONS 4-13 THROUGH 4-20, SELECT THE POWER SUPPLY SECTION THAT MATCHES THE CHARACTERISTIC DESCRIBED IN EACH QUESTION.

1. Regulator
2. Rectifier
3. Filter
4. Transformer

4-13. Isolates power supply from the input line voltage.

4-14. Provides regulated power to additional circuits for further filtering and/or conversion.

4-15. Converts ac input signal to pulsating dc voltage or ripple.

4-16. Steps up input line voltage.

4-17. Output of power supply is maintained at a constant level.

4-18. Necessary power for bus system terminating resistors.

4-19. Removes pulsating dc ripple and produces a useable dc voltage.

4-20. Provides dc power to backplane wire harness, and to remote, operator, and maintenance consoles.

4-21. The voltage levels and logic convention for mainframe and minicomputers are identical.

1. True
2. False

4-22. The output of the computer's power supply can be distributed by which of the following sections?

1. Rectifier only
2. Regulator only
3. Both rectifier and regulator
4. Filter

4-23. The power supply must protect the computer from which of the following elements?

1. Incoming power
2. Distributed power
3. Internal cabinet and/or module temperature
4. All of the above

4-24. A power supply will shut off while the computer is running under what condition(s), if any?

1. A low overtemperature condition
2. A high overtemperature condition only
3. A high overtemperature condition and an overcurrent condition
4. None

IN ANSWERING QUESTIONS 4-25 THROUGH 4-31, SELECT FROM THE FOLLOWING LIST THE SIGNAL GENERATED UNDER THE SPECIFIC CONDITION DESCRIBED IN EACH QUESTION.

1. POWER INTERRUPT (PI)
2. MASTER CLEAR (MC), AUTOMATIC
3. STOP

4-25. Used for computer initialization after power has been applied.

4-26. Source power falls below specifications and returns to normal.

4-27. Generates a class I interrupt.

4-28. Logic power goes out of tolerance.

4-29. Source power is lost or computer cabinet is shut off.

4-30. Generated a specific period after a PI occurs.

4-31. Prevents loss of memory data if logic power is lost faster than normal turn-off sequence can occur.

4-32. To indicate that power requirements have been met, what digital active signals are generated by a microcomputer's power supply?

1. LEDs only
2. Ac only
3. Dc only
4. Ac and dc

4-33. To provide protection to the computer, which of the following devices are placed in line with the power source?

1. Compensators only
2. Line conditioners only
3. Surge protectors only
4. Compensators, line conditioners, and surge protectors

4-34. Which of the following protective devices provide protection against brownouts?

1. ABTs
2. Surge protectors
3. Line conditioners only
4. Compensators and line conditioners

4-35. Line conditioners can provide all of the following protection except which one?

1. Suppress over-voltage
2. Filter input power
3. Bridge brownouts
4. Provide ac input voltage

4-36. Surge protectors retain their effectiveness with successive surges.

1. True
2. False

4-37. What device allows the computer to execute software during power absences up to 100 ms during transfer of primary power source?

1. UPS
2. Compensator
3. ABT
4. SPS

4-38. SPS and UPS are constructed in much the same way except for which feature?

1. Switching circuitry
2. Power loss is detected
3. Ac line current is sensed
4. Power is transferred from one primary source to another

4-39. What are the three major functional areas of a computer?

1. CPU, I/O, buses
2. CPU, memory, power supply
3. CPU, memory, I/O
4. CPU, I/O, power supply

4-40. Information concerning the logic implementation and interpretation of a specific digital computer would be found in which of the following references?

1. Technical manual
2. Technical manual and MRC
3. MRC only
4. NEETS, Module 13

4-41. In which of the following documents would contain the fictional schematics of a digital computer?

1. Technical manual only
2. Owner's manual only
3. Either the technical manual or the owner's manual
4. NEETS, Module 13

4-42. Which of the following references contain the test documentation and procedures, test equipment, and tools required to perform corrective maintenance on a specific computer?

1. Technical manual/owner's manual
2. MRC
3. Ship's electronics equipment doctrine
4. CSOSS documentation

4-43. Which of the following functional areas provide the means for the CPU, memory, and I/O to communicate with each other?

1. System cables
2. System buses
3. System modem
4. Wire bundles

4-44. What two interacting sections comprise the CPU?

1. Control and memory
2. ALU and memory
3. Control and ALU
4. ALU and I/O

4-45. All of the following are characteristics of the CPU's control section except which one?

1. Where to store information and who to talk with
2. How to compute logical solutions
3. When to start and stop
4. What to do

4-46. The control section may provide the computer with the ability to function under which of the following conditions?

1. Manual control only
2. Program control only
3. Manual and program control
4. Interface control

4-47. The control section includes all the following logically designed areas except which one?

1. Timing, and instruction and control
2. Fixed- and floating-point operations
3. Memories—control, cache, and read-only
4. Addressing and interrupts

4-48. What logically designed area in the control section regulates the operation of the computer?

1. Instruction and control
2. Addressing
3. Interrupts
4. Timing

4-49. What type of timing is used for the execution of instructions stored sequentially in memory?

1. Arithmetic timing
2. Synchronous operations
3. Master clock events
4. Asynchronous operations

IN ANSWERING QUESTIONS 4-50 THROUGH 4-55, SELECT FROM THE FOLLOWING LIST THE LOGICALLY DESIGNED AREA THAT PERFORMS THE OPERATION AS DESCRIBED IN EACH QUESTION.

1. Master clock
2. Main timing chain
3. Main timing signals
4. Timing sequences

4-50. Used to trigger a single-shot to enable and disable circuits in the sequence necessary to execute computer operations.

4-51. Flip-flops are arranged in a ring counter to count master clock phases.

4-52. Used to generate a command enable for sending data from one register to another.

4-53. Taps on a delay line oscillator can be used to provide additional phases.

4-54. Used to issue a series of commands to perform a particular instruction or operation.

4-55. Used to start arithmetic timing and generate command enables used for arithmetic operations.

4-56. To keep track of time intervals, which of the following types of timing circuitry can be used?

1. Monitor clock only
2. Programmable internal timer only
3. Monitor clock and programmable internal timer
4. Real-time clock (RTC)

4-57. To keep track of real time, which of the following timing circuits can be used?

1. RTC only
2. Monitor clock only
3. RTC and monitor clock
4. RTC and programmable interval timer

4-58. Which of the following timing circuits are software/machine instruction controlled?

1. RTC only
2. Monitor clock only
3. Programmable interval timer only
4. RTC, monitor clock, and programmable interval timer

4-59. To channel data inside the computer, what type of circuits are primarily used with registers for instruction and control operations?

1. Analog conversion
2. Data routing circuits
3. Code converter circuits
4. Interface circuits

4-60. A general-purpose register is also known by what name?

1. Instruction
2. Accumulator
3. Program counter
4. Status indicating

4-61. General-purpose registers are generally the same size as the computer's memory word.

1. True
2. False

A. Accumulator
B. Index register
C. Instruction register
D. Program counter
E. Status indicating register

Figure 4A.—Memory type circuits,

IN ANSWERING QUESTIONS 4-62 THROUGH 4-68, SELECT FROM FIGURE 4A THE MEMORY TYPE CIRCUIT THAT APPLIES TO THE FUNCTION DESCRIBED IN EACH QUESTION.

4-62. Used for address modification and counting.

1. A
2. B
3. C
4. D

4-63. Holds the address of the next instruction to be executed.

1. B
2. C
3. D
4. E

4-64. Can be used to indicate the status of operations in the computer.

1. B
2. C
3. D
4. E

4-65. Outputs of this register are translated into commands for CPU execution.

1. B
2. C
3. D
4. E

4-66. Used for temporary storage of data or memory addresses.

1. A
2. B
3. C
4. D

4-67. These registers are used with branching condition instructions to change the sequence of instruction execution.

1. A
2. B
3. D
4. E

4-68. Enables a single instruction to be used to specify a large number of operands indirectly.

1. A
2. B
3. C
4. D

4-69. In the general process of executing a machine instruction, what are the major parts?

1. Write the instruction to memory, update the program counter, translate the instruction, and execute the instruction
2. Encode the instruction, execute the instruction, update the program counter, and read the instruction from memory
3. Increment the instruction register, update the program counter, decode the instruction, and execute the instruction
4. Read the instruction from memory, update the program counter, translate the instruction, and execute the instruction

4-70. Which of the following methods can be used to change the sequence of program execution?

1. Stop and jump switches only
2. Program instructions only
3. Stop and jump switches and program instructions

4-71. Command enables are generated by which of the following parts of the general process of machine instruction execution?

1. Fetch the instruction
2. Update the program counter
3. Translate the instruction
4. Execute the instruction

4-72. The computer executes instructions at two level or states. Data bits in what register are used to select the instruction operating levels?

1. The index register
2. The program counter
3. The instruction register
4. The status indicating register

4-73. Interrupt processing instructions can be included in which of the following types of programs?

1. Executive function programs
2. Application programs to solve a fire control solution
3. Application programs to compute a sonobuoy pattern
4. Both 2 and 3 above

4-74. Which of the following instructions can only be performed in the executive state?

1. Add instructions
2. Subtract instructions
3. Privileged instructions that are part of interrupts
4. Read instructions

4-75. What is the purpose of instruction operand addressing?

1. To specify the location of the operand
2. To tell when to perform the instruction
3. To tell whereto obtain the instruction
4. To tell how to obtain the memory address of the instruction

ASSIGNMENT 5

Textbook Assignment: "Central Processing Units and Buses," chapter 5—continued, pages 5-13 through 5-23.

5-1. The interrupt that occurs with the actual event that caused the interrupt is (a) what type and (b) what will be the status of the condition of the process or program after the interrupt is processed?

1. (a) Asynchronous
   (b) Different conditions will exist
2. (a) Asynchronous
   (b) The exact same conditions will exist
3. (a) Synchronous
   (b) Different conditions will exist
4. (a) Synchronous
   (b) The exact same conditions will exist

5-2. What type of interrupt occurs (a) when there is an error in a peripheral device and (b) when 1/0 operations are terminated?

1. (a) External (b) internal
2. (a) External (b) external
3. (a) Internal (b) internal
4. (a) Internal (b) external

5-3. In a microcomputer, an interrupt from an internal hard disk can be masked out by the computer.

1. True
2. False

5-4. In microcomputers, which of the following methods can be used to direct the processor to the address of the interrupt of a maskable interrupt?

1. An interrupt code only
2. A ROM lookup table only
3. A ROM/PROM lookup table only
4. An interrupt code and a ROM/PROM lookup table

IN ANSWERING QUESTIONS 5-5 THROUGH 5-11, SELECT FROM THE FOLLOWING LIST THE INTERRUPT CLASS THAT MATCHES THE CONDITION OR PRIORITY DESCRIBED IN EACH QUESTION.

1. Class I
2. Class II
3. Class III
4. Class IV

5-5. An RTC overflow has occurred.

5-6. An intercomputer timeout has occurred.

5-7. The highest priority interrupt that can occur in the computer.

5-8. A power out of tolerance has occurred.

5-9. The computer will execute a power failure processing routine.

5-10. An input chain interrupt has occurred.

5-11. An illegal op code has been executed in the CPU.

5-12. Lower level interrupts can be disarmed and/or armed by software.

1. True
2. False

5-13. All of the following interrupts cannot usually be locked out by software except which one?

1. Power fault
2. External interrupt
3. CPU instruction fault
4. IOC instruction fault interrupt

5-14. In newer computers, which of the following methods can be used to retain multiple interrupt codes of the same class?

1. Interrupt stack only
2. Interrupt queue only
3. Both interrupt stack and queue
4. Index registers

5-15. For an interrupt signal in a particular class to be indicated to the CPU, what minimum number of interrupts must be present?

1. One
2. Two
3. Three
4. Four

A. Terminate current program execution
B. Lock out all interrupts
C. Store program and register data
D. Retrieve interrupt processor data
E. Enter executive state and enable desired interrupts
F. Execute interrupt processor program
G. Return to original process

Figure 5-A.—Interrupt handling process steps,

IN ANSWERING QUESTIONS 5-16 THROUGH 5-23, REFER TO FIGURE 5-A ABOVE AND FIGURE 5-9 ON PAGE 5-13 OF THE TRAMAN. SELECT THE MOST APPROPRIATE INTERRUPT HANDLING PROCESS STEP FOR THE PROCESS DESCRIBED IN EACH QUESTION.

5-16. New interrupts are locked out to protect the integrity of the process that ensures returning to the same conditions after processing the interrupt.

1. A
2. B
3. C
4. D

5-17. The step in which the interrupt process will be initiated.

1. A
2. B
3. C
4. D

5-18. In newer computers, a separate register set for each task and executive state is used, and these registers are disabled and the contents protected until the appropriate state is entered.

1. A
2. B
3. C
4. D

5-19. The computer enters the required executive state and enables the interrupts that in turn interrupt the interrupt processor after the status registers are loaded.

1. B
2. C
3. D
4. E

5-20. The new executive state registers are loaded with the interrupt processor program data after the register data is saved.

1. B
2. C
3. D
4. E

5-21. The current process's register data is stored with at least the contents of the program counter and status register(s).

1. A
2. B
3. C
4. D

5-22. The first instruction of an interrupt routine is executed after sampling interrupt code words.

1. D
2. E
3. F
4. G

5-23. The program counter and status register(s) is/are reloaded with the saved data. The next instruction, prior to the interrupt (instruction 4), is called up by the program counter.

1. D
2. E
3. F
4. G

5-24. It requires less time to access control memory than to access main memory.

1. True
2. False

5-25. Where is cache memory usually located in a computer?

1. In main memory
2. In the I/O section
3. Between the CPU's control and ALU sections
4. Between main memory and the CPU

5-26. For rapid data transfers, what two types of semiconductor devices are usually used by cache memories?

1. Bipolar DRAMs and MOS SRAMs
2. Bipolar SRAMs and bipolar DRAMs
3. MOS SRAMs and MOS DRAMs
4. MOS DRAMs and bipolar SRAMs

5-27. In terms of access and capacity of a cache memory, a cache memory is usually on the order of one magnitude ___(a)___ (slower; faster) than main memory and its capacity is two orders of magnitude ___(b)___ than main memory. (less; more)

1. (a) Slower (b) less
2. (a) Slower (b) more
3. (a) Faster (b) less
4. (a) Faster (b) more

5-28. Which of the following methods can be used by a cache memory to indicate which entries of main memory have been copied into it?

1. A hit
2. A tag store
3. An identifier
4. Both 2 and 3 above

5-29. Which of the following is/are properties of cache memory?

1. A high-speed memory
2. A logical network and an old entries replacement method
3. Timing and control
4. Each of the above

5-30. To indicate that data from the requested address is present, which, if any, of the following terms is used?

1. Hit
2. Miss
3. Tag
4. None of the above

5-31. What area of cache memory writes only to the directories?

1. Updates
2. Invalidates
3. Searches
4. Tags

5-32. What cache process is performed by a requestor other than the CPU within?

1. Main
2. Mapping
3. Eavesdrop
4. Searching

IN ANSWERING QUESTIONS 5-33 THROUGH 5-36, SELECT FROM THE FOLLOWING LIST THE CACHE MAPPING TECHNIQUE DESCRIBED IN EACH QUESTION.

1. Direct mapping
2. Fully associative mapping
3. Set associative mapping

5-33. Is the most flexible cache mapping technique with regards to where data can reside.

5-34. Combines the best cache mapping techniques.

5-35. Main memory locations can only be copied into one location in cache.

5-36. If cache is fill, a replacement algorithm is used to decide which block gets replaced by new data.

5-37. What cache read method can be used to present the cache and main memory with the reference simultaneously?

1. Look-aside, serial read
2. Look-aside, parallel read
3. Look-through, serial read
4. Look-through, parallel read

5-38. In a look-through read, the cache is checked last.

1. True
2. False

5-39. Optimum cache replacement would be psychic and have perfect knowledge of the future. What cache replacement policy, if any, comes closest to the optimum cache replacement?

1. LRU
2. FIFO
3. Random
4. None, all are very different

5-40. Instruction routines in a ROM are considered to have which of the following characteristics?

1. Permanent and volatile
2. Permanent and nonvolatile
3. Temporary and volatile
4. Temporary and nonvolatile

5-41. Permanent software loaded as firmware is the process known by which of the following terms?

1. Boot
2. Bootstrap
3. Boot Up
4. Each of the above

5-42. An NDRO in a militarized mainframe or minicomputer is usually located in which of the following places?

1. In the CPU module
2. In the chassis that contains CPU's pcbs
3. Either 1 or 2 above, depending on whether it is a mini or mainframe computer
4. On one or more IC chips of a CPU/memory pcb

5-43. Diagnostics programs on an NDRO include all of the following items except which one?

1. Test the timer
2. Load failure analysis
3. Memory and interface tests
4. Computer interconnection system

IN ANSWERING QUESTIONS 5-44 THROUGH 5-47, SELECT FROM THE FOLLOWING LIST THE AREA OF A BIOS DESCRIBED IN EACH QUESTION.

1. Diagnostic testing
2. Environmental inventory
3. Boot procedure

5-44. Testing the video, interrupt controller, CPU register and flags, or the keyboard.

5-45. A prompt is displayed to let you know the microcomputer is ready to use.

5-46. The ROM chip program searches for the operating system files.

5-47. The number of printers and serial ports are determined.

5-48. The ALU obtains the data required to perform arithmetic and logical calculations from which of the following places?

1. Timing circuits
2. Operands only
3. Designated CPU registers only
4. Operands and designated CPU registers

5-49. To perform computations, which of the following methods are used in addition and subtraction operations?

1. Radix minus one only
2. Radix minus two only
3. Conversion only
4. Radix minus one, radix minus two, and conversion

5-50. The destination of the results of ALU operations may include which of the following places?

1. Timing circuits
2. Registers only
3. Operands only
4. Registers and operands

5-51. Computers can be designed to use which of the following word-length operands to carry out arithmetic operations?

1. Whole-word, half-word, and quarter-word operands only
2. Single-length word operands only
3. Double-length word operands only
4. Whole-word, half-word, quarter-word, single-length word, and double-length word operands

5-52. Double-length memory word operands will be used for mathematical operations when the size of the result would be (a) _____ (less; greater) than the length of either of the registers used to provide inputs to the ALU or the operands being input to the ALU are _____ (b) _____ than a single word. (larger; smaller)

1. (a) Less (b) larger
2. (a) Less (b) smaller
3. (a) Greater (b) larger
4. (a) Greater (b) smaller

IN ANSWERING QUESTIONS 5-53 THROUGH 5-56, SELECT FROM THE FOLLOWING LIST THE ITEM USED BY THE ALU IN ARITHMETIC OR LOGICAL CALCULATIONS DESCRIBED IN EACH QUESTION.

1. Flags
2. Selectors
3. Counters

5-53. Used to keep track of shifts.

5-54. A carry or borrow condition is indicated.

5-55. Used to transfer data between various registers in the ALU.

5-56. Used to indicate the status of the last logical calculation.

5-57. What method is used to represent a integer number?

1. R's minus 1
2. R's minus 2
3. Fixed-point
4. Floating-point

5-58. For whole numbers, what is the maximum absolute decimal value that can be contained in a 6-bit register?

1. 31
2. 32
3. 63
4. 64

5-59. A zero in what (a) position indicates a positive number and a one in what (b) position indicates a negative number?

1. (a) msb (b) 1sb
2. (a) msb (b) msb
3. (a) lsb (b) lsb
4. (a) lsb (b) msb

5-60. In a 6-bit register, the largest positive value that can be contained is what decimal number?

1. 31
2. 32
3. 63
4. 64

5-61. When floating-point operations are performed, the radix point must be aligned properly. The alignment of the radix point takes place at which of the following times?

1. During arithmetic operations only
2. After arithmetic operations only
3. Either during or after arithmetic operations, depending on the type of operation
4. Before arithmetic operations

5-62. In floating-point operations, what is the fractional portion of the number called?

1. Characteristic
2. Mantissa
3. Radix
4. Sign

5-63. In a number, the radix point is usually placed in what location?

1. Between the sign bit and the msb of the characteristic
2. Between the sign bit and the lsb of the characteristic
3. Between the sign bit and the lsb of the mantissa
4. Between the sign bit and the msb of the mantissa

IN ANSWERING QUESTION 5-64, REFER TO FIGURE 5-15, FRAME A, ON PAGE 5-21 IN THE TRAMAN.

5-64. For which of the following reasons is zero extended through the most significant 16 bits of the word that contains the characteristic?

1. The integer is a positive number
2. The integer is a negative number
3. The mantissa is a positive number
4. The mantissa is a negative number

5-65. Where the most accuracy is required during floating-point operations, (a) what format is used with two 32-bit words and (b) what is the relationship of the characteristic to the mantissa?

1. (a) Single-precision
   (b) Characteristic is smaller
2. (a) Single-precision
   (b) Characteristic is larger
3. (a) Double-precision
   (b) Characteristic is smaller
4. (a) Double-precision
   (b) Characteristic is larger

5-66. Under which of the following conditions are the mantissa's results rounded up?

1. When the mantissa is less than one-half of one only
2. When the mantissa is greater than one-half of one only
3. When the mantissa is equal to or less than one-half of one
4. When the mantissa is equal to or greater than one-half of one

5-67. What type of floating-point interrupt condition, if any, exists when there is a positive excess?

1. Overflow
2. Underflow
3. Divisor
4. None, there is no floating point interrupt

5-68. What method does the ALU use to perform arithmetic and logical instructions?

1. Logical quotients of the logic gates
2. Logical products of the logic gates
3. Logical sums of the logic gates
4. Logical differences of the logic gates

5-69. The ALU portion of a computer can be designed to perform a wide variety of arithmetic operations. Which of the following are the only arithmetic capabilities that computers can have to perform all arithmetic operations?

1. Addition and multiplication
2. Addition and subtraction
3. Subtraction and multiplication
4. Subtraction and division

5-70. A computer has no dedicated square root instruction. Which of the following instructions could be used to perform the square root function?

1. Addition and subtraction only
2. Addition and comparison only
3. Subtraction and comparison only
4. Addition, subtraction, and comparison

5-71. Logical ALU functions include all of the following except which one?

1. AND and OR
2. NOT
3. Compare
4. BAM

5-72. A numeric data coprocessor operates in (a) what manner with the CPU and independent of the CPU using (b) which of the following buses?

1. (a) Parallel
   (b) Different buses from the CPU
2. (a) Parallel
   (b) The same buses as the CPU
3. (a) Serial
   (b) Different buses from the CPU
4. (a) Serial
   (b) The same buses as the CPU

ASSIGNMENT 6

Textbook Assignment: "Central Processing Units and Buses," chapter 5—continued, pages 5-24 through 5-29; "Computer Memories," chapter 6, pages 6-1 through 6-20.

6-1. The buses in a computer are controlled by (a) what functional area and (b) what type of communication path is used?

1. (a) CPU (b) serial
2. (a) CPU (b) parallel
3. (a) Memory (b) serial
4. (a) Memory (b) parallel

6-2. All the following types of information are transferred over buses except which type?

1. Power
2. Data
3. Commands
4. Instructions

6-3. The preferred method of transfer for data/information between system components is which of the following?

1. Control bus
2. Common data bus
3. Operand bus
4. Address bus

6-4. What IEEE standard is used for a simple 32-bit backplane bus?

1. 1196
2. 1296
3. 896.1
4. 1014

A. Control bus
B. Address bus
C. Data bus
D. Instruction (I) bus
E. Operand (C) bus
F. I/O mem bus or IOC bus
G. Time multiplexed bus
H. DMI bus

Figure 6-A.—Buses.

IN ANSWERING QUESTIONS 6-5 THROUGH 6-11, REFER TO FIGURE 6-A. SELECT THE NAME(S) OF THE BUS OR BUSES THAT IS/ARE DESCRIBED IN EACH QUESTION.

6-5. This bus has all the signals necessary to define any of the possible memory address locations within the computer or a module.

1. A
2. B
3. C
4. D

6-6. This bus (or buses) can be used to transfer instructions from memory to the CPU.

1. A
2. B
3. C only
4. Both C and D

6-7. This bus allows communication between the CPU and memory or the CPU and the IOC.

1. C
2. D
3. E
4. F

6-8. Controlled by the IOC, this bus responds to the CPU by using the O bus.

1. E
2. F
3. G
4. H

6-9. This bus transmits individual signals to control and coordinate the operations of the computer.

1. A
2. B
3. C
4. D

6-10. This bus transmits addresses and data by using clock cycles.

1. E
2. F
3. G
4. H

6-11. Acts as a requester, this bus is used to send requests from other computers.

1. E
2. F
3. G
4. H

6-12. What device accepts requests and uses a priority network to determine the order in which it is to respond to the requesters?

1. Operand bus extender
2. REI bus extender
3. CPU
4. DMI

6-13. Regardless of whether a computer has an IOC or not, the CPU will control all buses.

1. True
2. False

6-14. In bus communications, which of the following factors relating to the data being transferred must be considered?

1. Source only
2. Destination only
3. Transfer priority only
4. Source, destination, and transfer priority

6-15. Bus requests may be made by all of the following parts except which one?

1. CPU
2. IOC
3. Memory
4. DMI

6-16. Holding registers are used by source and destination sections to prevent data loss and to help coordinate data exchange.

1. True
2. False

6-17. In the exchange of data on the buses, (a) what logic generates a ready signal when data is in the holding register and on the bus and (b) what logic sends an accept signal?

1. (a) Source (b) source
2. (a) Source (b) destination
3. (a) Destination (b) source
4. (a) Destination (b) destination

6-18. Which of the following items is stored in main memory?

1. Data and programs only
2. Calculations and operands only
3. Data, programs, and PROMS
4. Data, programs, calculations, and operands

A. Memory address
B. Capacity
C. Access time
D. Destructive readout
E. Non-destructive readout
F. Volatile memory
G. Nonvolatile memory

Figure 6-B.—Terminology.

IN ANSWERING QUESTIONS 6-19 THROUGH 6-24, REFER TO FIGURE 6-B. SELECT THE TERM THAT MATCHES THE DESCRIPTION IN EACH QUESTION.

6-19. Time interval from the instant a request for data is initiated until the data is available for use.

1. A
2. B
3. C
4. D

6-20. The output side of a flip-flop is read from memory without having to be rewritten.

1. D
2. E
3. F
4. G

6-21. The power to the computer is turned off and the contents of memory are retained.

1. D
2. E
3. F
4. G

6-22. The particular location of a larger memory array where a packet of information is located.

1. A
2. B
3. C
4. D

6-23. Power is shut off to the computer and the contents of the semi- conductor memory are lost.

1. D
2. E
3. F
4. G

6-24. The data is lost when it is read from memory.

1. A
2. B
3. C
4. D

6-25. A memory unit that can receive requests from more than one CPU or I/O section is known as which of the following types of memories?

1. Memory pcb
2. Single-inline memory module
3. Multiported memory module
4. Dual-action memory module

6-26. Pcb type memories are usually composed of which of the following memory types?

1. Semiconductor
2. Core
3. Film
4. Both 2 and 3 above

6-27. In a typical square form memory, the intersection of an x row and y column is called a

1. memory word address
2. memory word
3. memory module
4. memory cell

6-28. The x rows and y columns of a typical memory will be equal in number.

1. True
2. False

6-29. Memory operations in most computers usually include which of the following items?

1. Control circuits
2. Timing circuits
3. Memory cycle
4. All of the above

6-30. Memory interface circuits include which of the following items?

1. Address register
2. Communication lines
3. Interfacing register
4. Both 2 and 3 above

6-31. A word is read from memory, then rerouted back through the Z register to be rewritten. This is what type of memory?

1. Non-destructive readout
2. Destructive readout
3. Hardwired
4. ROM

6-32. Priority of memory requests are evaluated by which of the following devices?

1. Control circuits
2. Address register
3. Z register
4. CPU

6-33. Memory read/write enables are provided by which of the following devices?

1. Control circuits
2. Timing circuits
3. CPU
4. I/O control

6-34. During a complete memory cycle, the first thing that must occur is which of the following?

1. Registers used for read/write operations are cleared
2. Enables are generated to gate memory address into registers used for read/write operations
3. Memory address translation is accomplished
4. Interface logic acknowledges reading data from memory

6-35. To locate a memory address word, the computer uses which of the following items in memory?

1. Timing circuits
2. Control circuits
3. Interface circuits
4. Memory logic

6-36. The conversion from a logical to a physical memory address is a function of which of the following items in memory?

1. Memory logic
2. Timing circuits
3. Control circuits
4. Interface circuits

6-37. In all computers, for every read operation there will always be a corresponding write operation.

1. True
2. False

6-38. In order to increase memory speed using interleaving, which of the following items are required?

1. Memory modules of 32 bits
2. A minimum of 8 memory modules
3. More complex CPU and memory control circuitry
4. All of the above

6-39. When odd parity is used for memory fault detection, all words stored in memory will have which of the following bits?

1. A logic 1 parity bit
2. A logic 0 parity bit
3. An even number of set bits stored at each memory location
4. An odd number of set bits stored at each memory location

6-40. The memory protection register set is used for which of the following purposes?

1. To restrict read/write operations in portions of memory
2. To protect memory from unplanned power loss
3. To protect against erroneous write instructions
4. To limit access of memory to authorized users

6-41. In a memory segment within the protected area with all three bits of the memory protection control register set, which of the following operations are allowed?

1. Execute protected
2. Write protected
3. Read protected
4. All of the above

6-42. Memory lockout is used by larger computers to prevent access to particular areas of memory by task state instructions. Which of the following describes the lockout function?

1. It is disabled when the CPU enters a particular executive or interrupt state and enabled when the CPU enters the task state
2. It is enabled when the CPU enters a particular executive or interrupt state and enabled when the CPU enters the task state
3. It is enabled when the CPU enters a particular executive ‘or interrupt state and disabled when the CPU enters the task state
4. It is disabled when the CPU enters a particular executive or interrupt state and disabled when the CPU enters the task state

6-43. Compared with semiconductor memories, magnetic memories have which of the following advantages?

1. They cost less
2. They are faster in terms of storage and access
3. They require less power and they are volatile
4. They require less power and they are nonvolatile

6-44. The state of a core or film is changed by which of the following conditions?

1. Current flow in the opposite direction of sufficient magnitude to overcome the magnetic field and to magnetize in the new direction
2. Current flow in the same direction of sufficient magnitude to match the magnetic field and to magnetize in the old direction
3. Voltage amplitude of a sufficient magnitude to overcome the magnetic field and to magnetize in the new direction
4. Current flow in the opposite direction of sufficient magnitude to overcome the magnetic field and to magnetize in the old direction

6-45. Compared with core memory, film memory has which of the following advantages?

1. Increased speed of read/write operations and less power required
2. More compact and durable
3. Twice as many memory cells can be put in the same space for the same amount of power
4. Each of the above

6-46. Each ferrite core can store what total number of bits?

1. One
2. Two
3. Three
4. Four

6-47. In a four-wire core winding, what is the physical make up of the windings that are strung through each and every core?

1. 1 drive line, 1 sense line, and 1 inhibit line
2. 2 drive lines, 1 sense line, and 2 inhibit lines
3. 2 drives lines, 1 sense line, and 1 inhibit line
4. 2 drive lines, 2 sense lines, and 1 inhibit line

IN ANSWERING QUESTIONS 6-48 THROUGH 6-51, SELECT THE CORE LINE THAT MATCHES THE DESCRIPTION IN EACH QUESTION.

1. Drive line
2. Sense line
3. Inhibit line

6-48. Detects the change in state of the core from one to zero.

6-49. Each line provides 1/2 of the current necessary to change the state of the core.

6-50. Prevents changing the core from a zero to a one.

6-51. In a three-wire core, this line performs the same function as in the four-wire core.

6-52. To simplify addressing, reading, and writing operations, magnetic cores are arranged in which of the following ways?

1. In hierarchical patterns
2. In matrices
3. In planes
4. In stacks

6-53. Which core in an array will be switched from one state to another?

1. A core with a full read or write current passing through it
2. A core with a half read current passing through it
3. A core with a half write current passing through it
4. A core with a half read or write passing through it

6-54. In a core array the inhibit line is threaded in ____(a)____ with the x or y drives
(series, parallel)
lines and the sense line threaded through _____(b)____ core.
(each, every other)

1. (a) Series (b) each
2. (a) Parallel (b) each
3. (a) Series (b) every other
4. (a) Parallel (b) every other

6-55. What is the basic building block of the memory stack?

1. Matrix
2. Array
3. Plane
4. Quadrant

6-56. The address register bits are used to translate the bits to make which of the following bit selections?

1. Stack only
2. Inhibit upper and lower stack only
3. X and Y primary, secondary, and diode only
4. X and Y primary, secondary, and diode; stack; and inhibit upper and lower stack

6-57. Which selectors are activated only when writing zeros?

1. Inhibit
2. X and Y primary
3. X and Y secondary
4. X and Y read/write diode

6-58. In a core read/write cycle, the read current is designed to change the state of the core(s) to (a) what value; and the write current is designed to change the state of the core(s) from (b) what value to (c) what value?

1. (a) Zero (b) zero (c) one
2. (a) Zero (b) one (c) one
3. (a) One (b) zero (c) one
4. (a) One (b) one (c) one

6-59. The process of reading cores to the zero state is known as which of the following types of readout?

1. Destructive readout
2. Non-destructive readout
3. Volatile readout
4. Nonvolatile readout

6-60. In a core memory, a restore cycle is necessary after data has been read from memory for what reason, if any?

1. To change the state of each selected core from zero to one
2. To change the state of all the cores from one to zero
3. To sense the state of each core
4. None, a restore cycle is not needed

6-61. During a restore operation of zeros in a three-wire core, the absence of write current on which of the following lines will leave the cores in the zero state?

1. Digit
2. Word
3. X drive
4. Y drive

6-62. What specific number of paired film spots is used for each bit position?

1. One
2. Two
3. Three
4. Four

6-63. Current flow through which of the following lines will magnetize a film spot?

1. Drive
2. Word only
3. Sense/digit only
4. Word or sense/digit, depending on the function

6-64. In the application of external fields, the longitudinal fields are produced by passing the current (a) in which of the following ways and the transverse fields are produced by passing the current (b) in which of the following ways?

1. (a) Down the word line
   (b) In the proper direction along the sense/digit line
2. (a) In the proper direction along the word line
   (b) Down the sense/digit line
3. (a) In the proper direction along the sense/digit line
   (b) Down the word line
4. (a) In the proper direction along the sense/digit line
   (b) Down the drive line

6-65. In a film memory, a packet stores what specific number of bits of data?

1. One
2. Two
3. Three
4. Four

6-66. Which, if any, of the following devices makes the mated film cells less susceptible to the disturbance from other cells in close proximity to them?

1. Ground plane
2. Insulator
3. Keeper
4. None of the above

6-67. How is mated film memory structured?

1. Bit organized
2. Stack organized
3. Word organized
4. Array organized

6-68. What item is the basic building block of the film memory stack?

1. Matrix
2. Array
3. Packet
4. Plane

6-69. The memory capacity of a film core storage device is determined by which of the following factors?

1. Size of the computer
2. Number of packets only
3. Size of the array in the memory stack only
4. Number of packets and the size of the array in the memory stack

6-70. In film storage, up to how many words can be selected at each memory location?

1. One
2. Two
3. Three
4. Four

6-71. The address register bits used to translate the bits to make selections are processed in which of the following sequences?

1. Word at the address location, memory location, and stack
2. Stack, word at the address location, memory location
3. Word at the address location, stack, and memory location
4. Stack, memory location, and word at the address location

6-72. A mated film memory cell is read by which of the following methods?

1. A current is generated along the digit line and a transverse field is applied to the thin film cell
2. A current is generated along the sense line and a transverse field is applied to the thin film cell
3. A current is generated along the word line and a transverse field is applied to the thin film cell
4. A current is generated along the word line and a longitudinal field is applied to the thin film cell

6-73. What factor will determine the recorded state of the film?

1. The direction of the cell vector rotation induced film signal on the sense/digit line
2. The direction of the cell vector rotation induced film signal on the word line
3. The magnitude of the cell vector rotation induced film signal on the digit line
4. The direction of the cell vector rotation induced film signal on the sense line

6-74. When a one is to be stored, (a) what is the direction of the bit current in relationship to that used to store a zero and (b) what field steers the vector to the one state?

1. (a) The same
   (b) Transverse
2. (a) The same
   (b) Longitudinal
3. (a) Reversed
   (b) Transverse
4. (a) Reversed
   (b) Longitudinal

6-75. In a restore operation of a film memory, what factor determines the direction of the digit current on the sense/digit line?

1. Binary value of the data register
2. Direction of current on the word line
3. The easy axis
4. The hard axis

ASSIGNMENT 7

Textbook Assignment: "Computer Memories," chapter 6—continued, pages 6-20 through 6-32, and "Input/Output (I/O) and Interfacing," chapter 7, pages 7-1 through 7-20.

7-1. Semiconductor memories are known by all of the following terms except which one?

1. Read/write memory
2. Scratch-pad memory
3. Random access memory
4. Read-only memory

7-2. Semiconductor memories have which of the following characteristics?

1. Destructive readout and volatile
2. Destructive readout and nonvolatile
3. Non-destructive readout and volatile
4. Non-destructive readout and nonvolatile

7-3. Each RAM chip contains which of the following items?

1. One memory cell only
2. One memory cell and the logic to support it only
3. Large numbers of memory cells only
4. Large numbers of memory cells and the logic to support them

7-4. On RAM chips, memory cells are organized based on which of the following factors?

1. Number of memory words only
2. Number of bits per word only
3. Number of memory words and number of bits per word
4. Number of gate arrays

7-5. The transistors used in flip-flops of static RAM may be MOS or bipolar. Compared to MOS, bipolar has what advantage, if any?

1. Higher density
2. Higher access speed
3. Requires less space
4. None, they both have the same advantages

7-6. In a static RAM, the address lines are used to enable the addressed memory cell flip-flop circuit by row and column number.

1. True
2. False

IN ANSWERING QUESTION 7-7, REFER TO FIGURE 6-31 ON PAGE 6-24 OF THE TRAMAN.

7-7. Data is stored, or read from, the memory cells of SRAM via a total of how many lines?

1. One
2. Two
3. Three
4. Four

7-8. The (a) address lines and the (b) I/O data lines are usually tied to what buses?

1. (a) Computer or memory system bus
   (b) Computer or memory system bus
2. (a) Computer or memory system bus
   (b) Data bus
3. (a) Data bus
   (b) Computer or memory system bus
4. (a) Data bus
   (b) Data bus

7-9. During a SRAM read cycle, what is (a) the status of the write enable and (b) the mode of the data buffers?

1. (a) True (b) input
2. (a) True (b) output
3. (a) False (b) input
4. (a) False (b) output

IN ANSWERING QUESTION 7-10, REFER TO FIGURE 6-32 ON PAGE 6-25 OF THE TRAMAN.

7-10. Each dynamic RAM cell consists of which of the following devices?

1. One MOS transistor only
2. One tiny capacitor only
3. One MOS transistor and one tiny capacitor only
4. Many MOS transistors and several tiny capacitors

7-11. DRAM cells do not retain their charged state for more than a few milliseconds. This degradation is due to which of the following factors?

1. Time only
2. Temperature only
3. Time and temperature
4. Temperature and power

7-12. To retain their charged state, DRAMs must be refreshed. Of the following methods, which one is (a) more cost effective because it uses what (b) device?

1. (a) Internal
   (b) Battery backup
2. (a) Internal
   (b) Single refresh address generator
3. (a) External
   (b) Battery backup
4. (a) External
   (b) Single refresh address generator

7-13. In DRAM organization, the data input and data output lines may be tied together in what type of application, if any?

1. One that uses a unidirectional data bus
2. One that uses a bidirectional data bus
3. None, they are never tied together

7-14. Compared to a SRAM, a DRAM has all except which of the following advantages?

1. It retains its charged state
2. It has lower power consumption
3. It has higher density
4. It is less complex

7-15. Programs stored on ROM are often referred to as firmware for which of the following reasons?

1. They are software only
2. They are hardware only
3. They are more hardware than software
4. They write data into the ROM address

7-16. Compared to RAM, ROM has all of the same operational characteristics except which of the following?

1. Allows random access
2. Uses a row/column arrangement
3. Can be read by normal computer accessing methods
4. Can be written to by normal computer accessing methods

7-17. ROM has what primary use?

1. Stores data addresses for recovery purposes
2. Allows the computer to perform I/O operations
3. Provides a user interface through a panel
4. Stores the content of the computer registers for interrupt processing

7-18. The acronym BIOS stands for what term?

1. Basic input/output system
2. Bipolar input/output status
3. Binary input/output status
4. Bidirectional input/output system

7-19. The acronym NDRO stands for what term?

1. Non-destructive readover
2. Non-destructive readout
3. Non-dynamic readover
4. Non-dynamic readout

IN ANSWERING QUESTION 7-20, REFER TO FIGURE 6-35 ON PAGE 6-28 OF THE TRAMAN.

7-20. In the example, the ROM chip memory array has a total of(a) how many decoders and (b) how many lines are input to these decoders?

1. (a) 2 (b) 12
2. (a) 2 (b) 13
3. (a) 4 (b) 12
4. (a) 4 (b) 13

7-21. ROMs may be made of which of the following materials?

1. Hardwired and magnetic only
2. Fusible links only
3. MOS and bipolar transistors only
4. Hardwired, magnetic, fusible links, and MOS and bipolar transistors

7-22. To perform ROM operations, which of the following circuits are used?

1. Timing and control signals only
2. Registers, flip-flops, and internal buses only
3. Internal buses, timing, and control signals only
4. Timing, control signals, registers, flip-flops, and internal buses

7-23. Compared to PROM, an erasable PROM has what additional advantage, if any?

1. It can be used over and over again without reprogramming
2. It can be erased and reprogrammed
3. It can be field programmed by an authorized technician
4. None, there is no additional advantage

7-24. While still in the circuit, which of the following PROMS can (a) be programmed and (b) erased?

1. (a) EAPROM/EEPROM
   (b) EAPROM/EEPROM
2. (a) EAPROM/EEPROM
   (b) UV EPROM
3. (a) UV EPROM
   (b) EAPROM/EEPROM
4. (a) UV PROM
   (b) UV PROM

7-25. A device that serves as a shared entry point from a local-area network into a larger information resource is which of the following?

1. Gateway
2. Input/output adapter (IOA)
3. Input/output controller (IOC)
4. Data terminal equipment (DTE)

7-26. A function that transfers status by using the appropriate control signals from a transmitting device to the receiving computer is which of the following?

1. Input data (ID)
2. Output data (OD)
3. External fiction (EF)
4. External interrupt (EI)

7-27. The I/O processor controls which of the following transfers?

1. The transfer of data between registers
2. The transfer of information between main memory and the CPU
3. The transfer of timing signals between the ALU and the CPU
4. The transfer of information between main memory and the external equipments

7-28. Establishing, directing, and monitoring transfers with external equipments are the functions of which of the following devices?

1. CPU
2. IOA
3. IOC
4. Bidirectional bus

7-29. Changes to input and output control and data signal voltages are functions of which of the following devices?

1. CPU
2. IOA
3. IOC
4. Bidirectional bus

7-30. The type of connectors for the I/O channels or ports will be dictated by which of the following factors?

1. Interfacing
2. Serial I/O
3. Parallel I/O
4. Voltage levels

7-31. The driver circuits are used for which of the following tasks?

1. To pass data to the IOC
2. To seticlear output registers
3. To pass interface signals to the IOC
4. To pass interface and data signals to the external equipments

7-32. External microcomputer I/O operations are usually handled by which of the following devices?

1. A single serial port
2. A single parallel port
3. A single printed circuit board
4. Multiple printed circuit boards

7-33. Examples of consistencies found in the architecture of a computer's I/O section include which of the following?

1. Types of external equipments
2. The arrangement and format of the information exchanged
3. The type and number of interfaces possible
4. The type of circuits used to process I/O information

7-34. If a printer senses a paper jam during a print operation, which of the following actions would occur?

1. A control word would be sent by the computer specifying an error condition
2. A control word would be sent to the computer specifying an error condition
3. A data word would be sent by the computer specifying a special condition
4. A data word would be sent to the computer specifying a special condition

7-35. Handshaking is also known by which of the following terms?

1. Function control word
2. External interrupt words
3. Both 1 and 2 above
4. Alphabetic and numeric data exchange

7-36. The type of interface used when all bits of information represented by a byte or word are input or output simultaneously is known as which of the following formats?

1. Serial format
2. Parallel format
3. 8-bit word format
4. 32-bit word format

7-37. Command instructions provide control over which of the following areas/operations?

1. Main memory
2. CPU operations
3. IOC single and dual channel operations
4. Interrupt driven I/O operations

7-38. The I/O command start instruction accomplishes which of the following actions?

1. Specifies an IOC, then halts further CPU processing
2. References specific main memory addresses
3. Executes a previously stored IOC command
4. Indicates to the CPU that the command has been processed

7-39. The CPU will delay processing while waiting for an I/O operation only during which of the following actions?

1. Execution of input chain operations
2. Execution of output chain operations
3. Actual data transfer operations
4. Executions of an I/O command start instruction

7-40. The actual execution of chaining instructions is independent of the CPU.

1. True
2. False

7-41. Input and output chains deal primarily with which of the following activities?

1. The processing of IOC control words
2. Specification of the locations of external status words
3. Transfer of blocks of information
4. Addresses provided by the load control memory command

7-42. Data transfer between the computer and external equipments will take place when which of the following conditions is/are met?

1. The memory areas for the data have been specified by the computer programs
2. The external equipment is ready to send or receive data and has sent a request signal
3. Initiate input/output or equivalent instruction is executed by the CPU
4. All of the above

7-43. Which of the following is one of the constants in all I/O operations?

1. Data words will always be limited to 16 bits
2. When the data transfer will begin
3. The circuitry required to connect external equipments
4. A serial data interface between the computer and external equipments

7-44. In I/O operations, communications with the external equipment require which of the following devices/operating modes?

1. An IOC
2. A single channel operating mode
3. Circuitry that specifies a sequence of events
4. A dual channel operating mode

7-45. When an index address in main memory is specified by an external equipment during an I/O operation, the computer is operating in which of the following modes?

1. Intercomputer channel mode
2. Externally specified index mode
3. Externally specified address mode
4. Dual channel mode

7-46. In I/O operations, which of the following is one of the primary uses of registers?

1. To enable and route data information only
2. To enable and route control information only
3. To enable and route both control and data information
4. To provide timing circuitry for I/O interfacing

7-47. Decoder circuits are used for which of the following purposes?

1. Main timing
2. I/O processors
3. Address translation
4. Data buffers

7-48. Status registers are used for which of the following purposes?

1. To enable and route data using the internal bus system
2. To hold or buffer data during interchanges between the very fast CPU and slower external equipments
3. To hold control data generated by main memory or the CPU when operating with very fast external equipments
4. To hold information for the CPU that indicates the operating condition and current activities of the external equipments

7-49. In computers with an IOC, once started the master clock can be stopped when which of the following actions occurs?

1. Computer master clear
2. External interrupt
3. Input data request
4. Output data request

7-50. In computers with an IOC, the master clock is started when which of the following actions occurs?

1. The computer is initially powered on
2. The computer is auto restarted
3. Both 1 and 2 above
4. An execute master clear is issued

7-51. The I/O control circuits are controlled by which of the following means?

1. The CPU
2. The IOC
3. The I/O master clock
4. The computer program

7-52. A sequential set of memory locations that contains data to be sent out or an area that is set aside for data to be received is called which of the following?

1. An input register
2. An output register
3. Both 1 and 2 above
4. A buffer

7-53. Which of the following are unbuffered operations?

1. Data transferred between computer and external devices
2. Where data is exchanged between the
3. CPU and various parts of the computer
   Both 1 and 2 above
4. Data exchanged between external devices offline

7-54. The I/O processor's sequencing circuits control which of the following actions?

1. The order in which events will be executed based upon the translated function code
2. The order in which memory addresses of data to be retrieved or stored will be acted on
3. The order in which external equipment output requests will be acknowledged
4. The order in which external interrupts will be acted on by the computer

7-55. The CPU interfaces with the I/O processor through which of the following means?

1. Special interface circuits
2. The CPU's I/O instructions
3. The sequencing circuitry
4. The maintenance console

7-56. I/O control memory words are set aside in main memory to control which of the following actions?

1. Data transfers for I/O buffer functions
2. The sequence of I/O operations
3. Parallel operations
4. Serial operations

7-57. In parallel operations, each I/O channel has its own block of memory addresses for which of the following operations?

1. Input and output only
2. External function only
3. External interrupt operations only
4. Input, output, external function, and external interrupt operations

7-58. Serial operations are affected by which of the following factors?

1. Character size, parity selection, and asynchronous interfacing only
2. Parity selection, baud rate, and synchronous interfacing only
3. Character size, parity selection, and synchronous and asynchronous interfacing only
4. Character size, parity selection, baud rate, and synchronous and asynchronous interfacing

7-59. Monitor words are used for which of the following purposes?

1. To monitor external equipment status
2. To monitor bytes that are to be transferred by the pending operation
3. To store characters for comparison with received data characters
4. To monitor main memory for the next available address for chaining instructions

7-60. Another term for accumulator based I/O is which of the following?

1. Direct CPU interface
2. Direct memory access
3. Interrupt driven I/O
4. Memory mapped I/O

7-61. The CPU handles all I/O transactions by executing one or more instructions for each word of information transferred. This process is known by which of the following terms?

1. Polled I/O
2. Memory mapped I/O
3. Interrupt driven I/O
4. Accumulator based I/O

7-62. In memory mapped I/O, the CPU accesses the I/O device by which of the following means?

1. Tieing peripheral devices directly into the communication bus
2. Placing appropriate addressing information on the bus
3. Checking each channel or port to determine if it has data for input or is ready to accept output data
4. Using an I/O processor for interface between memory and the external equipments

7-63. During direct CPU interface operations, the CPU continuously tests the status register. This technique is known by which of the following terms?

1. Memory mapped I/O
2. Accumulator based I/O
3. Interrupt driven I/O
4. Polled I/O

7-64. The main advantage of direct memory access is which of the following?

1. Speed
2. Reliability
3. Less complicated circuity
4. Maximum utilization of memory

7-65. When the CPU and the DMA attempt to access main memory simultaneously, the CPU has priority.

1. True
2. False

7-66. When a high speed disk drive is used, output data will be in which of the following forms?

1. Octal
2. Binary
3. Octal coded decimal
4. Various; form is dependent on type of interface used

7-67. The technique used when more than one peripheral device is connected to a single port/channel is known by which of the following terms?

1. Daisy chaining
2. Independent request control
3. External interrupt control method
4. Request/acknowledge control method

7-68. When more than one peripheral device is connected to a single port/channel, the priority of a device is determined by which of the following factors?

1. The CPU
2. The I/O controller
3. The computer program
4. The order of connection

7-69. When using a request and acknowledge system, the priority of the fictions and channels is determined by which of the following factors?

1. The CPU
2. The I/O controller
3. The computer program
4. The order of connection

7-70. Communication formats are governed by which of the following items?

1. The type of external equipment
2. The speed of the external equipment
3. The interfacing standard
4. The speed of the computer

7-71. The compatibility of voltage levels between the computer and external equipments is ensured by which of the following means?

1. The CPU
2. The I/O processor
3. The I/O interfacing components
4. The type and number of pins in the cable connectors

7-72. Transfer of data within a digital computer is accomplished internally using which of the following means?

1. Standard I/O interfaces
2. Serial format
3. Parallel format
4. Serial interface board

7-73. The conversion of data for transmission over a serial channel is accomplished by which of the following means?

1. A serial interface board
2. A standard format interface
3. A universal receiver-transmitter
4. I/O control printed circuit board

7-74. When a universal synchronous-asynchronous receiver transmitter is used, it functions as which of the following devices?

1. A microprocessor
2. An I/O serial interface board
3. An I/O parallel interface board
4. A peripheral device to the microprocessor

7-75. The universal synchronous-asynchronous receiver transmitter's specific asynchronous interfacing is controlled by which of the following means?

1. The bidirectional tristate data bus
2. The I/O control printed circuit board
3. The read/write control logic
4. The CPU

ASSIGNMENT 8

Textbook Assignment: "Input/Output (I/O) and Interfacing," chapter 7—continued, pages 7-20 through 7-38.

8-1. The read/write control logic accepts control signals from which of the following devices?

1. The data bus
2. The control bus
3. The master clock
4. The USART

8-2. To program the USART for the applicable interface when it is in an idle state, which of the following signals/words is required?

1. A reset signal
2. A clock signal
3. A new set of data words
4. A new set of control words

8-3. The universal synchronous-asynchronous receiver transmitter is enabled for reading/writing operations when which of the following signals is true?

1. The WRITE DATA
2. The CHIP SELECT
3. The CONTROL DATA
4. The DATA SET READY

8-4. When the WRITE DATA (WD) signal is true, it means which of the following things?

1. It indicates the microprocessor is placing data on the data bus
2. It indicates the microprocessor is ready to receive data or control words
3. It identifies the write operation as a data or control word
4. It enables the universal synchronous/asynchronous receiver transmitter for writing operations

8-5. When the READ DATA (RD) signal is true, the microprocessor is ready for which of the following activities?

1. To receive data only
2. To receive status words only
3. To receive data and status words
4. To receive clock signals

8-6. The transmit control logic converts the data bytes stored in the transmit buffer into which of the following forms?

1. An asynchronous bit stream
2. Start bits
3. Stop bits
4. Parity bits

8-7. A start bit is used for which of the following purposes?

1. To initiate data transfer
2. To alert the output device
3. To control transmit logic
4. To program protocol

8-8. A parity bit is used for which of the following purposes?

1. To regulate signal flow
2. To specify data type
3. To detect errors
4. Each of the above

8-9. The receive buffer stores which of the following information?

1. The output bit stream
2. The protocol signals
3. Serial bytes
4. Parallel bytes

8-10. The voltage and current characteristics of line drivers/receivers are dictated by which of the following factors?

1. The format
2. The interface
3. Channel/port configurations
4. Type of circuitry (TTL or MOS)

8-11. Type A (NTDS) Slow interface format is able to transmit which of the following number of bit groupings?

1. 16 only
2. 30 only
3. 32 only
4. 16, 30, or 32, depending on the type of computer

8-12. The data transmission rate for Type A (NTDS) Slow format is limited by which of the following factors?

1. The requirement to convert data from serial to parallel
2. The type of equipment used
3. The large voltage change between logic states
4. The long distance the transmission must cover

8-13. In Type D (NTDS SERIAL) interface format, information frames are made up of what total number of bits?

1. 32 bits
2. 16 bits
3. 3 bits
4. 8 bits

8-14. Type D (NTDS SERIAL) interface format can transmit digital signals up to which of the following lengths?

1. 300 feet
2. 1000 feet
3. 1500 feet
4. The total length of the cable used regardless of its length

8-15. Type E (NATO SERIAL) format requires which of the following I/O cables?

1. Coaxial
2. Triaxial
3. Dual coaxial
4. Twisted pairs

8-16. Type E (NATO SERIAL) format is most frequently used with which of the following equipment?

1. Mainframe computers
2. Minicomputers
3. Microcomputers

8-17. Type F (aircraft internal time division multiplex [TDM] bus) interface format transmits bit groupings consisting of what total number of bits?

1. 16
2. 20
3. 30
4. 32

8-18. Type F (aircraft internal time division multiplex [TDM] bus) interface format can handle which of the following numbers of external devices on one channel?

1. 16
2. 30
3. 32 (including a bus controller)
4. 34 (including a bus controller)

8-19. Type G (RS-449) interface format primarily uses which of the following protocols?

1. Request acknowledge
2. Command and response
3. SIS/SOS
4. Interrupt/request

8-20. The Small Computer System Interface (ANSI X3.131) using one controller can daisy chain up to what maximum number of units?

1. 8
2. 16
3. 30
4. 32

8-21. The RS-232 interface can be used for which of the following types of transfers?

1. Asynchronous parallel only
2. Synchronous parallel only
3. Asynchronous and synchronous parallel
4. Asynchronous and synchronous serial

8-22. The RS-232 interface can be used with which of the following types of computers?

1. Micros only
2. Mainframes only
3. Minis and mainframes only
4. Micros, minis, and mainframes

8-23. The RS-232 interface limits cable transfers to what maximum number of feet?

1. 50
2. 100
3. 300
4. 1000

8-24. In the RS-232 interface, most peripherals control configuration parameters using which of the following methods?

1. A controller card
2. Dip switches
3. Software
4. VACALES

8-25. The higher transmission rate of the RS-422 interface is made possible by which of the following techniques?

1. Two separate wires are used
2. The receiver transition period is narrower
3. The grounding requirements are less critical
4. All of the above

8-26. In a token ring network, a station with a message waits until it receives a free token, it then changes the free token to a busy token, and transmits a block of data following the busy token. What term is used for the block of data?

1. Record
2. Server
3. Frame
4. File

8-27. The Ethernet interface is used to transfer which of the following types of data in what format?

1. Serial I/O data in packet format
2. Serial data in string format
3. Parallel I/O data in packet format
4. Parallel I/O data in string format

8-28. The type of cable used for the Ethernet interface is which of the following?

1. Twisted pairs
2. Unshielded coaxial
3. Shielded coaxial
4. Triaxial

8-29. Thin Ethernet interface used in smaller systems can have a maximum cable length of which of the following?

1. 500 feet
2. 600 feet
3. 1000 feet
4. 1500 feet

8-30. The Centronics Compatible Parallel interface uses which of the following types of protocol?

1. Command/acknowledge
2. Interrupt driven
3. Asynchronous
4. Synchronous

8-31. Most floppy disk drives today are controlled by which of the following interfaces?

1. Enhanced small device interface
2. ST-506/412 interface
3. Integrated drive electronics interface
4. RS-422 interface

8-32. When using the ST-506/412 interface, the controller card performs which of the following functions for disk drives?

1. Moves the magnetic head
2. Spins the magnetic disk
3. Strips off formatting and control words
4. All of the above

8-33. When using the ST-506/412 to interface a hard disk drive, the cabling required is which of the following?

1. A 34-pin control cable
2. A 20-pin data cable
3. Both 1 and 2 above
4. A shielded coaxial cable

8-34. When using the ST-506/412 to interface a floppy disk drive, the cabling required is which of the following?

1. A 34-pin control cable
2. A 20-pin data cable
3. Both 1 and 2 above
4. A shielded coaxial cable

8-35. The enhanced small device interface can transfer data at up to which of the following rates?

1. 5 megabits per second
2. 24 megabits per second
3. 125 megabits per second
4. 1.2 gigabytes per second

8-36. When using the enhanced small device interface with a floppy disk drive, the cabling required is which of the following?

1. A 34-pin control cable
2. A 20-pin data cable
3. Both 1 and 2 above
4. A shielded coaxial cable

8-37. All electronics used for the integrated drive electronics interface are located in which of the following areas?

1. The computer motherboard
2. The controller card
3. The integrated CPU
4. The ard drive

8-38. The integrated drive electronics interface can handle disk drives with a maximum capacity of which of the following?

1. 1 MB
2. 80 MB
3. 180 MB
4. 300 MB

8-39. The minimum number of conductors required for I/O serial data operations is which of the following?

1. 1
2. 2
3. 37
4. 4

8-40. During asynchronous data exchange, a frame of data must include which of the following bits at a minimum?

1. One start bit
2. One stop bit
3. Seven character bits
4. All of the above

8-41. During asynchronous data exchange, the maximum number of bits for one frame of data is which of the following?

1. 8
2. 9
3. 10
4. 11

8-42. Compared to asynchronous data exchange, synchronous data exchange has which of the following advantages?

1. Faster speed
2. More reliability
3. Less electronics required
4. Fewer bits required for each character

8-43. The generally accepted standard connector for implementing an RS-232 connection has what total number of pins?

1. 12
2. 25
3. 26
4. 32

8-44. The protective ground, pin 1 of the RS-232 interface connector in the DTE/DCE mode should always be connected to the shielded cable shield at both ends.

1. True
2. False

8-45. Pin 7 of the RS-232 interface connector in the DTE/DCE mode should always be connected at both ends for which of the following reasons?

1. To complete the path for control signals only
2. To provide a complete path for the data signals only
3. To provide timing signals to the peripheral device only
4. To provide a common reference for all signals

8-46. Pin 3 of the RS-232 interface connector in the DTE/DCE mode is used for which of the following purposes?

1. To send data signals
2. To send control signals
3. To receive data signals
4. To receive control signals

8-47. Pins 4, 5, 6, and 20 are used in the DTE/DCE mode using the RS-232 interface connector for which of the following purposes?

1. To send and receive data signals
2. To send and receive control signals
3. To send and receive timing signals
4. To establish the communications link

8-48. In parallel data operations, the IOA or line driver/receiver provides the means to accomplish which of the following tasks?

1. Convert the byte or word to a sequential bit stream
2. Drive or detect the digital signals
3. Convert serial data to parallel data
4. Provide constant timing signals at the specified voltage levels

8-49. In parallel data operations, one I/O channel could consist of which of the following devices?

1. Two cables, one for input and one for output or a single cable to handle both input and output
2. Eight or more data lines
3. A number of control lines
4. All of the above

8-50. The data strobe in single parallel cable operations is used for which of the following purposes?

1. Checks for data on the data lines
2. Ensures that the data on the data lines is stable
3. Signals the external device that data is ready to be read from the data lines
4. All of the above

8-51. In single parallel cable operations, a busy signal would be sent under which of the following conditions?

1. The computer output buffer is full
2. The external equipment is not energized
3. The external equipment input buffer is full
4. The computer is involved in internal operations

8-52. In two cable parallel operations, an external interrupt enable can be described as which of the following?

1. A signal sent from the external device on the input line
2. A signal sent from the computer on the output line
3. A signal sent from the external device on the output line
4. A signal sent from the computer on the input line

8-53. When an external interrupt code is placed on the data lines, it is accompanied by which of the following signals?

1. An external interrupt request
2. An input data acknowledge
3. An input data request
4. All of the above

8-54. When the computer samples an interrupt code, which of the following signals will occur?

1. An external interrupt acknowledge
2. An external interrupt enable
3. An input data acknowledge
4. All of the above

8-55. In a two cable sequence of events for input data, the first event will be which of the following?

1. The external equipment sets the IDR line
2. The external equipment places a word of data on the ID lines
3. The computer sets the input data request line
4. The computer clears the IDA line

8-56. In the two cable sequence of events for input data, the computer has sampled the data on the ID lines. Which of the following events must occur before the computer will accept more data?

1. The IDR must be cleared
2. A new data word must be placed on the I/O lines
3. The IDR must be reset
4. All of the above

8-57. During a normal external function sequence of events, the computer places an EF code word on the OD lines. The next event to take place is which of the following?

1. The EFR line is set
2. The ODA line is set
3. The EFR line is cleared
4. The EFA line is set

8-58. During forced external functions, the computer does not require which of the following signals?

1. An EFR
2. An EFA
3. An ODR
4. An ODA

8-59. During the external interrupt sequence of events, what is the first event that must occur before a computer will accept an external interrupt?

1. The EI code word is placed on the ID lines
2. The EIE line is set
3. The EIR line is set
4. The IDA line is set

8-60. During the external interrupt sequence of events, the computer samples the EI code word on the ID lines and clears the EIE line for data to continue to transfer. Which of the following events, must occur?

1. The computer sets the IDA line only
2. The external equipment detects the setting of IDA line only
3. The computer clears the IDA line only
4. The computer sets the IDA line, the external equipment detects the setting of the IDA line, and the computer clears the IDA line

8-61. All computers used by the Navy will have EIE lines.

1. True
2. False

8-62. In intercomputer I/O operations when parallel channels are used, the input and output cables will have which of the following characteristics?

1. The input and output cables can be uneven in number
2. An ODA signal becomes a resume signal
3. An ODR signal becomes a ready signal
4. The input and output cables will be identical

8-63. During intercomputer I/O operations, command words include which of the following data?

1. External functions only
2. Forced external finctions only
3. External function buffer words only
4. External functions, forced external functions, and external function buffer words

8-64. During intercomputer I/O operations, command word functions are identified by use of which of the following techniques?

1. Flag words
2. Setting ODA lines
3. Additional interface signals
4. All of the above

8-65. During intercomputer I/O operations, in order for a buffered command word transfer to be possible, the transmitting computer must have (a) what line and the receiving computer must have (b) what line?

1. (a) EFR (b) EIE
2. (a) EFR (b) EFR
3. (a) EIE (b) EIE
4. (a) EIE (b) ERF

8-66. For an intercomputer command word buffered transfer, the receiving computer is ready to accept an external function command word. This is signaled by which of the following means?

1. The external function request line is set
2. The external interrupt enable line is set
3. The external fiction acknowledge is set
4. The input data request line is set

8-67. During an intercomputer command word buffered transfer, before putting the EF code on the data lines, the transmitting computer recognizes which of the following signals?

1. An EFR
2. An EFA
3. An ODA
4. All of the above

8-68. In intercomputer command word transfers when the transmitting computer does not have an EFR line, the command word will be transferred in what way, if any?

1. As a data word
2. As a buffered command word
3. As a forced command word
4. None, data cannot be transferred without an EFR line

8-69. In intercomputer I/O operations, all command words specified by the receiving computer's EF buffer control words will be transferred one command word at a time.

1. True
2. False

8-70. Before the intercomputer data transfer sequence of events can begin, which of the following events must have occurred on the same channel?

1. An OD buffer must have been established on the transmitting computer
2. An ID buffer must have been established on the receiving computer
3. Both 1 and 2 above
4. An IDA must have been established

8-71. In intercomputer data transfers, the data word is held on the OD lines until the receiving computer performs which of the following tasks?

1. Sets the IDR line
2. Clears the IDR line
3. Sets the resume line
4. Clears the resume line

8-72. In intercomputer data transfer, the receiving computer recognizes the ready line of the transmitting computer as what line?

1. The IDR line
2. The ODR line
3. The ODA line
4. The resume line

8-73. In intercomputer data transfer, the transmitting computer recognizes the IDA line of the receiving computer as what line?

1. The IDR line
2. The ODR line
3. The ODA line
4. The resume line

8-74. In intercomputer data transfer, after one data word has been transferred and before the next data word is placed on the data OD lines, which of the following events occurs?

1. The receiving computer sets the IDA line
2. The transmitting computer clears the ready line
3. Both 1 and 2 above
4. The receiving computer clears the EFR line

ASSIGNMENT 9

Textbook Assignment: "Computer Instructions and Man/Machine Interfaces" chapter 8, pages 8-1 through 8-26.

9-1. Various programming languages and types of languages are used to write computer programs. Which of the following are examples of procedural-type languages?

1. COBOL and FORTRAN
2. COBOL and BASIC
3. FORTRAN and BASIC
4. BASIC and Ada

9-2. For embedded applications, which of the following languages could be used?

1. BASIC
2. FORTRAN
3. COBOL
4. Ada

9-3. Which of the following languages is considered an interactive language?

1. Ada
2. BASIC
3. COBOL
4. FORTRAN

9-4. Before a program can be executed on a computer, it may need to be translated. Which of the following types of languages need to be translated?

1. High level only
2. Assembly only
3. High level and assembly
4. Machine code

9-5. Computer instructions to perform designated operations are contained in an instruction set. Which of the following is another name for instruction set?

1. Operation set
2. Repertoire of instructions
3. Operating system instructions
4. Instruction formats

9-6. Other names for the plan used to write a program include which of the following terms?

1. Algorithm
2. Formula
3. Utility
4. Application

9-7. Some programs are stored in ROM or PROM. Which of the following is another name used for these read-only programs?

1. Operating systems
2. Utilities
3. Hardwired
4. Applications

9-8. What type of program provides the link between the computer hardware and the user and enables the execution of operational programs?

1. Operating system
2. Application
3. Utility
4. User interface

9-9. Operating systems are a collection of many programs used by a computer to manage its own resources and operations. All of the following are types of operating systems except which one?

1. Programmed operational and functional
2. Single tasking
3. Multitasking
4. Real-time

9-10. Which of the following are names commonly used to describe the programs for tactical, tactical support, and/or nontactical applications?

1. Application programs only
2. Operational programs only
3. Operational and processing programs only
4. Application, operational, and processing programs

9-11. Commercially available programs designed to solve specific classes of problems are often called by which of the following terms?

1. Packaged software only
2. Off-the-shelf software only
3. Packaged and off-the-shelf software
4. On-the-shelf software

9-12. All of the following are considered utility programs except which one?

1. POFA
2. Operating system
3. Online diagnostic test
4. General routine to copy a disk

9-13. A predetermined and installed set of microinstruction is called what type of instruction?

1. Multiple instruction
2. Microinstruction
3. Mini-instruction
4. Controlled instruction

9-14. Which of the following types of instructions are classified by the function they perform?

1. Transfer of control only
2. Movement and transfer of control, only
3. Movement, transfer of control and arithmetic only
4. Movement, transfer of control, arithmetic, and logical

9-15. Data assignment instructions are normally held in which of the following types of registers?

1. Flag registers only
2. Memory address registers only
3. Memory address registers and active status registers
4. Flag registers and active status registers

9-16. All of the following are examples of data assignment instructions except which one?

1. Branch instruction address
2. Fixed point overflow
3. Interrupt lockouts
4. Compare designators

9-17. What type of instruction makes it possible to change the sequence in which a computer performs instructions?

1. Data assignment
2. Arithmetic
3. Logical
4. Branch

9-18. What type of instruction will change the sequence of instructions only if a condition is met?

1. Conditional branch
2. Unconditional branch
3. Logical branch
4. Automatic branch

9-19. What type of instructions include and, or, not, exclusive or/nor, compare, and shift instructions?

1. Data assignment
2. Arithmetic
3. Logical
4. Branch

9-20. In addition to classifying instructions by their functions, instructions maybe classified by their action on operands.

1. True
2. False

9-21. Instructions are the same on all computers.

1. True
2. False

9-22. All instructions include at least which of the following parts?

1. An operation code
2. An operand address
3. A modifier code
4. A register name

IN ANSWERING QUESTION 9-23, REFER TO FIGURE 8-3 ON PAGE 8-7 OF THE TRAMAN.

9-23. In a 16-bit microcomputer instruction, in what positions would the operation code be located?

1. Bits 2^5 and 2^4
2. Bits 2^{11} and 2^{10}
3. Bits 2^{15} through 2^{13}
4. Bits 2^{16} through 21^3

9-24. The formats of instructions on mainframe computers vary greatly for all of the following reasons except which one?

1. Manufacturer of the computer
2. Generation of the computer
3. Memory size of the computer
4. Type of computer

QUESTIONS 9-25 THROUGH 9-33 PERTAIN TO THE EXAMPLE INSTRUCTION FORMATS FOR A MAINFRAME COMPUTER WITH 32-BIT INSTRUCTIONS ON PAGES 8-8 THROUG 8-10 IN THE TRAMAN.

9-25. A total of how many basic instruction formats are given?

1. One
2. Five
3. Seven
4. Nine

9-26. Which of the following fields are consistent in all the instruction formats?

1. Designator field (a) only
2. Function code (f) only
3. Designator field (a) and function code (f)
4. Function code (f) and subfunction code (f_2)

9-27. The a field is used to identify all except which of the following registers?

1. Stack pointer
2. Accumulator
3. Memory
4. Index

9-28. Basic load, store, replace, and simple mathematical operations are performed using what instruction format?

1. I
2. II
3. IV-B
4. V

9-29. Format II instructions perform all except which of the following types of operations?

1. Interrupt
2. I/O commands
3. Single precision mathematics
4. Program sequence control jumps

9-30. What is the maximum value of a subfunction code of(a) two bits and (b) three bits?

1. (a) 2 (b) 3
2. (a) 2 (b) 7
3. (a) 3 (b) 5
4. (a) 3 (b) 7

9-31. Formats IV-A and IV-B are half-word instructions and two of them may be stored in one memory word. Which of the following methods is used to keep track of upper/lower instruction execution?

1. Active status register
2. Indirect addressing mode
3. Monitor clock
4. Accumulator

9-32. For operations such as setting, clearing, or testing an individual bit, what instruction format is used?

1. IV-B
2. IV-C
3. III
4. II

9-33. For single- and double-precision floating-point math operations, what instruction format would be used?

1. I
2. II
3. III
4. V

9-34. Which of the following are types of operand addressing?

1. Direct and indirect only
2. Extended, immediate, and implicit only
3. Indexed and relative only
4. Direct, indirect, extended, immediate, implicit, indexed, and relative

9-35. In which addressing mode is the operand itself contained in the instruction?

1. Extended
2. Immediate
3. Implicit
4. Relative

9-36. An instruction in which no operand address needs to be specified because the operation code contains all the information needed uses what addressing mode?

1. Extended
2. Immediate
3. Implicit
4. Indexed

9-37. Which addressing mode requires the operand address to be generated when the instruction is being prepared for execution?

1. Indexed operand
2. Immediate
3. Indirect
4. Direct

9-38. In relative addressing, what two items must be added together to obtain the correct instruction or operand address?

1. Base address and offset
2. Base address and memory register
3. Offset and index register
4. Memory word and memory register

9-39. Instruction sizes vary among types and generations of computers. They include which of the following sizes?

1. Character and full-word only
2. Full-word and half-word only
3. Full-word and double-length word only
4. Character, half-word, full-word, double-length word, and multiple word

9-40. Microcomputers commonly use instructions of what word lengths?

1. Multiple
2. Double
3. Full
4. Half

9-41. Man-machine interfaces have at least data entry and data display capabilities.

1. True
2. False

9-42. The data entry function of a man-machine interface is used to enter commands or set parameters for which of the following activities?

1. Test activities only
2. Computer operations only
3. Status and computer operations only
4. Computer operations, status, and test activities

9-43. When a computer is continually executing instructions one after another as directed by its logic circuits and software, it is in what operating mode?

1. Run
2. Step
3. Phase
4. Sequence

9-44. When you want to put the computer in the stop mode, which of the following methods can you use?

1. Manual action using STOP pushbutton
2. Program control using a STOP instruction
3. Both 1 and 2 above
4. Timing clock circuits

9-45. What mode of operation enables a technician to test the contents of registers and memory locations at the end of each instruction execution?

1. Run
2. Step
3. Phase
4. Sequence

9-46. Which of the following operating modes enable a technician to test conditions during the execution of an instruction?

1. Phase and sequence
2. Step and stop
3. Run and phase
4. Run and step

9-47. The purpose of master clear is to clear which of the following areas?

1. All I/O registers only
2. All CPU registers only
3. All I/O and CPU registers only
4. All memory locations only

QUESTIONS 9-48 THROUGH 9-65 PERTAIN TO MICROCOMPUTERS.

9-48. With a microcomputer, all of the following methods are commonly used to inform the processor of the system configuration except which one?

1. Battery protected storage
2. Switchboard panels
3. DIP switches
4. Jumpers

9-49. Each switch in a dual-inline package (DIP) indicates ON/OFF status. DIP switches can be used in which of the following ways?

1. Each single switch indicates the status of a component only
2. Each single switch indicates a requirement of the system operator only
3. Single and/or combinations of switches indicate the status of a component or the requirements of the system operator
4. Two switches must be used together to indicate any operational status

9-50. Board mounted DIP switches are designed so you can manually set them during which of the following tasks?

1. Component installation only
2. Component removal only
3. Initial configuration only
4. Component installation and removal, and initial configuration

9-51. Jumpers have which of the following characteristics?

1. Jumper settings are considered temporary
2. Jumpers must be physically removed and reinserted
3. Jumpers can only be manually positioned during component installation
4. Only a single jumper maybe used to specify a configuration option

9-52. A jumper connector consists of which of the following parts?

1. A receptacle only
2. A plug only
3. A receptacle and a plug
4. A set of switches

9-53. Jumpers have what purpose?

1. To define the configuration of each pcb
2. To connect the communications cables from a computer to an external device
3. To bridge a loose connection inside a computer chassis
4. To set a series of conditions to affect data flow within external devices

9-54. Which of the following are examples of functions affected by jumpers?

1. Mode of operation
2. Clock speed and wait states
3. I/O connections
4. Each of the above

9-55. Newer microcomputers have a hardware/configuration program stored as firmware.

1. True
2. False

9-56. In newer microcomputers, configuration data may be stored in which of the following ways?

1. In ROM
2. In EPROM protected by a rechargeable battery
3. In RAM protected by a rechargeable battery
4. On disk or tape, depending on the microcomputer's design

9-57. In microcomputers with battery protected storage, where is the battery located?

1. In the keyboard
2. On the backplane/motherboard
3. In an external battery pack
4. In the surge protector

9-58. DIP switches and battery protected storage provide different basic configuration data to the microcomputer.

1. True
2. False

9-59. All of the following are examples of system setup/configuration options except which one?

1. Date and time data
2. Floppy disk drive identifiers
3. Type of video display and refresh time period
4. ROM content

9-60. Microcomputers usually have which of the following types of power?

1. Ac only
2. Fixed time period rechargeable battery only
3. Ac and fixed time period rechargeable battery
4. Ac and variable time period rechargeable battery

9-61. A voltage or line select switch allows a microcomputer to operate in which of the following voltage ranges?

1. 100 to 130 only
2. 200 to 230 only
3. 100 to 130 and 200 to 230 only
4. 100 to 230

9-62. The keyboard and monitor of a microcomputer provide for all except which of the following functions?

1. Control cooling and battle short conditions
2. Running software programs
3. Performing tests
4. Viewing results

9-63. Internal diagnostics are performed in the power on sequence. The computer notifies you of errors (a) in what way and that everything is correct (b) in what way?

1. (a) Displays an error message if possible
   (b) Displays a message telling you to load the disk operating system
2. (a) Displays a menu to enable you to run external diagnostics
   (b) Displays a message telling you to load the DOS
3. (a) Displays an error message if possible
   (b) Loads DOS and displays an appropriate DOS display
4. (a) Displays an error message always
   (b) Loads DOS and displays an appropriate DOS display

9-64. Compared to internal diagnostics, LEDs provide which of the following advantages?

1. They simplify diagnostic software
2. They are easier to read than displayed messages
3. They save random access memory space
4. They enable the operator to select tests

9-65. Under DOS, you can also use disk based diagnostics with test selection menus. These menus usually provide which of the information on the monitor?

1. Test selection only
2. Test status only
3. Test status and error indications only
4. Test selection, test status, and error indications

9-66. In addition to providing information on the operating system and software programs, panels on some minicomputers provide which of following controls and indicators?

1. Power only
2. Temperature only
3. Power and temperature

9-67. Internal diagnostics, called built-in tests (BIT's), are designed to perform tests on which of the following devices?

1. CPUs only
2. IOCs only
3. CPUs and IOCs only
4. CPUs, IOCs, and any optional circuits

9-68. The pass/fail results of BITs will be displayed on the front panel. To decipher an error code from a failed test result and find the location of the module that may fix the problem, you should take which of the following actions?

1. Ask the senior DS
2. Look at the fault isolation table
3. Write down the error code and submit it to the trouble- shooting desk
4. Write down the error code and submit it to your supervisor

9-69. To configure a mainframe computer for reduced capability, you need to know which of the following information?

1. The capabilities and limitations of the system only
2. How to set the controls and switches on the computer and the switchboard only
3. How to set the controls and switches on the switchboard panels and the display and communications subsystems
4. The capabilities and limitations of the system, and how to set the switches on the computer, the switchboard panels, and the communications subsystems

9-70. Power to a mainframe computer is critical. Which of the following methods maybe used to ensure there is stable power?

1. Circuit breaker protection
2. Indicators for blower and logic to show if there is stable power
3. Interrupts to indicate power fluctuations
4. Each of the above

9-71. In addition to controls, switches, and pushbutton indicators, newer mainframe computers use which of the following devices to display status information and address the contents of registers?

1. Displays only
2. Keyboards only
3. Displays and keyboards
4. Keyboards and voice generated messages

9-72. On mainframe computers, internal diagnostics to test hardware and return pass/fail results may include which of the following types?

1. Diagnostics on tape or disk
2. Built-in tests (BITs)
3. Tests on NDRO
4. Both 2 and 3 above

9-73. To perform bootstrap on a minicomputer or mainframe computer, what type of memory is used?

1. DRAM
2. SRAM
3. CMOS RAM
4. NDRO

9-74. Inspect and change routines are used on minicomputers and mainframe computers for which of the following purposes?

1. To ensure the software is operating properly
2. To patch or revise software
3. To change hardware configurations
4. To change software/hardware interfaces

9-75. In a mainframe or minicomputer, what determines which peripheral device will be used to execute bootstrap?

1. The positions of the jumpers
2. The position of the bootstrap switch
3. The position on a DIP switch
4. The position of the step switch

ASSIGNMENT 10

Textbook Assignment: "Magnetic Tape Storage," chapter 9, pages 9-1 through 9-21.

10-1. Which of the following types of storage is used to store large amounts of data that are not required by the computer on a regular basis?

1. Main memory storage
2. Secondary memory storage
3. Tertiary memory storage
4. Thin film memory storage

10-2. Magnetic tape can be used to store large amounts of data in a variety of convenient package sizes.

1. True
2. False

10-3. Which of the following materials can be used as a base for magnetic tape?

1. Plastic
2. Iron oxide
3. Rubber
4. Paper

10-4. Which of the following materials can be used to form the oxide coating of a magnetic tape?

1. Gamma ferric oxide only
2. Chromium dioxide only
3. Gamma ferric oxide and chromium dioxide
4. Plastic

10-5. Which of the following procedures should NOT be used when magnetic tapes are handled?

1. Keep unused tapes in dustproof containers
2. Keep containers free of dust and contaminants
3. Store tapes in electromagnetically shielded cabinets
4. Store tapes on the top of equipment

10-6. To identify magnetic tapes, use adhesive labels with which of the following characteristics?

1. Easily erasable
2. Adhere permanently to tape containers
3. Both 1 and 2 above
4. Easily removable without leaving a residue

10-7. You should store tapes in the same room where they are to be used for which of the following reasons?

1. To reduce handling only
2. To prevent variations in environmental conditions only
3. To reduce handling and to prevent variations in environmental conditions
4. To decrease the time needed to find the tape

10-8. When anew tape is received, what actions, if any, should you take?

1. Immediately mount the tape on a drive to read the information
2. Condition the tape to the environment in which it is to be used
3. Copy the tape as soon as it is received
4. None; no special action is required

10-9. What effect, if any, could result from you touching the magnetic oxide of a tape?

1. The oils and acids from human skin could damage the tape
2. Your fingers could turn brown from picking up bits of the oxide
3. You could get sick because the oxide is extremely toxic
4. None; no effect

10-10. A tape cleaner performs which of the following actions?

1. It shaves the oxide of the tape only
2. It wipes down both sides of the tape with a cleaning solution only
3. It first shaves the oxide side of the tape, then it wipes down both sides of the tape with a cleaning solution
4. It alters the flux patterns on the tape

10-11. Which of the following maintenance actions reduces the static buildup on open reel magnetic tapes?

1. Degaussing
2. Cleaning
3. Certifying
4. Stripping

10-12. A tape certifier performs all of the following tasks except which one?

1. Cleans the tape
2. Erases the tape
3. Checks the tape's ability to record high density data, to retain magnetic flux patterns, and to be demagnetized
4. Restores the original data to the tape

10-13. For a tape that cannot be certified, what action, if any, should you take?

1. Destroy it
2. Keep it for use as a scratch tape only
3. Put it into general use because the standards of a tape certifier are higher than they need to be
4. None; no action is required

10-14. To nullify all the magnetic flux patterns is the sole purpose of which of the following machines?

1. A cleaner
2. A stripper
3. A degausser
4. A certifier

10-15. What area of a magnetic tape tends to show the greatest amount of wear?

1. The area just after BOT
2. The area just before EOT
3. The interrecord gap area
4. The file mark

10-16. To correct a tape's worn or damaged areas, which of the following actions should be accomplished?

1. Degaussing
2. Cleaning
3. Stripping
4. Splicing

10-17. After stripping a magnetic tape, what is the minimum length of tape you should leave on the reel?

1. 500 feet
2. 400 feet
3. 300 feet
4. 200 feet

10-18. You should not splice a tape for which of the following reasons?

1. Tape splices are generally the weakest point on the tape
2. Read and write operations may not perform properly in the area of the splice
3. Splicing a broken tape usually will not save the data
4. Each of the above

10-19. All tape media used in a system must be accounted for in which of the following ways?

1. Listed
2. Labeled only
3. Numbered only
4. Labeled and numbered

10-20. An operational program tape being delivered to a system is considered which of the following types of tape?

1. New
2. Used
3. Master
4. Scratch

10-21. A tape containing data that maybe written over is called what type of tape?

1. New
2. Used
3. Master
4. Scratch

10-22. Master tapes must be protected from which of the following operations?

1. Read
2. Write
3. copy
4. Duplication

10-23. Tapes generated from a master tape are referred to by which of the following terms?

1. New
2. Used
3. Working copies
4. Scratch

A
Submit tape for stripping or cleaning/certifying.
B. Make a new working copy from master.
C. Remove tape from unit and clean transport.
D. Attempt to read or write tape on different transport.
E. Align the magnetic tape transport.

FIgure 10-A.—Magnetic tape maintenance actions.

IN ANSWERING QUESTIONS 10-24 THROUGH 10-26, SELECT FROM FIGURE 1O-A THE PROPER MAINTENANCE ACTION TO CORRECT THE PROBLEM DESCRIBED IN THE QUESTION.

10-24. A working copy receives read errors from several tape transports.

1. A
2. B
3. C
4. D

10-25. The tape has visible damage.

1. A
2. B
3. D
4. E

10-26. A tape reads properly from all transport is except one.

1. A
2. B
3. D
4. E

10-27. What is the form taken by a tape after it has been wound on a reel?

1. Tape
2. Tape deck
3. Tape roll
4. Tape pack

10-28. What winding error causes steps to be observed in the tape pack?

1. Windowing
2. Spoking
3. Pack slip
4. Cinching

10-29. What tape condition is caused when a loosely wound tape is exposed to extreme heat or humidity?

1. Windowing
2. Spoking
3. Pack slip
4. Cinching

10-30. What tape condition is caused when tension is increased toward the end of the winding operation?

1. Windowing
2. Spoking
3. Pack slip
4. Cinching

10-31. Storage of data using a magnetic tape unit is based on which of the following principles?

1. Current flow in a conductor can be generated by a change in the magnetic lines of force that cut through a conductor
2. Changing the current flow in a conductor creates a change in the magnetic lines of force radiating from the conductor
3. Both 1 and 2 above
4. Current flow cannot be created by moving a conductor through a magnetic field

10-32. The electromagnetic-type conductor used to create a magnetic spot on a magnetic tape is called a

1. read head
2. write head
3. flux pattern
4. magnetic oxide

10-33. A magnetic spot recorded on a magnetic surface may be sensed by an electromagnetic-type conductor called a

1. read head
2. write head
3. flux pattern
4. magnetic oxide

10-34. Data stored on a magnetic surface may only be read once.

1. True
2. False

10-35. A flux pattern magnetized in one direction to indicate a binary ONE and the opposite direction to indicate a binary ZERO is a characteristic of which of the following recording techniques?

1. Return-to-zero
2. Non-return-to-zero
3. Phase encoding

10-36. Using narrow current spikes to write small flux patterns is a characteristic of which of the following recording techniques?

1. Return-to-zero
2. Non-return-to-zero
3. Phase encoding

10-37. A binary ONE indicated by a change in flux direction is a characteristic of which of the following recording techniques?

1. Return-to-zero
2. Non-return-to-zero
3. Phase encoding

10-38. What recording technique, if any, provides for the highest data density?

1. Return-to-zero
2. Non-return-to-zero
3. Phase encoding
4. None; they all provide the same density

10-39. An invisible line on a tape where data is written or read a bit at a time is called a

1. file
2. frame
3. record
4. track

10-40. Data bits written concurrently across the width of the tape are called a

1. file
2. frame
3. record
4. track

10-41. Which of the following terms indicates the density of data stored on multitrack tape?

1. Bits per inch
2. "Characters per inch
3. Frames per inch
4. Records per inch

10-42. A nine-track magnetic tape contains (a) what number of data bits and (b) what number of parity bits?

1. (a) 7 (b) 2
2. (a) 8 (b) 1
3. (a) 9 (b) 1
4. (a) 9 (b) 0

10-43. In which of the following recording techniques is the presence of a frame indicated by the detection of a binary ONE?

1. Return-to-zero
2. Phase encoding
3. Non-return-to-zero
4. Non-return-to-zero indiscrete

10-44. When writing or searching for data, which of the following tape markings is a common starting point used by a system?

1. BOT
2. EOT
3. Both 1 and 2 above
4. IRG

10-45. Data cannot be written or read under which of the following conditions?

1. The tape is stopped
2. The tape is just starting to move
3. The tape is stopping movement
4. All of the above

10-46. The start/stop effect creates a blank spot on the tape until which of the following conditions is met?

1. The tape is up to speed
2. The tape is stopped
3. The tape is starting to move
4. The tape is stopping movement

10-47. A group of contiguous frames is called a

1. file
2. record
3. software
4. track

10-48. Record length is fixed by the magnetic tape device.

1. True
2. False

10-49. A file can be defined as a group of

1. bits
2. characters
3. frames
4. records

10-50. Every file on a tape ends with a

1. file mark
2. interrecord gap
3. parity bit
4. record

10-51. Which of the following parity checks uses each frame's parity bit?

1. Odd
2. Even
3. Lateral
4. Longitudinal

10-52. The parity bit in a seven-track frame consisting of 011 101 would be a ONE for which of the following parity formats?

1. Odd
2. Even
3. Lateral
4. Longitudinal

10-53. Odd parity is commonly used with non-return-to-zero indiscrete recording for what purpose?

1. File mark
2. Frame identification
3. Interrecord timing
4. Tape speed

10-54. Which of the following parity checks uses a check frame?

1. Odd
2. Even
3. Lateral
4. Longitudinal

10-55. Each bit in the check frame contains the parity bit for all the ONES in a particular

1. file
2. frame
3. record
4. track

10-56. Which of the following is NOT a function of the magnetic tape controller?

1. Receives data and commands from the computer
2. Reformats data into frame-size bytes
3. Detects BOT
4. Checks parity

10-57. The tape speed for all read, write, and search operations is what total number of inches per second?

1. 100
2. 120
3. 180
4. 200

10-58. Tapes without a write-enabling ring are protected from the write operation.

1. True
2. False

10-59. What MTU operation compares the first word of each record to a specified key?

1. Read
2. Search
3. Space file
4. Write

10-60. During a rewind operation, what signal will cause tape motion to stop?

1. BOT
2. EOT
3. Low tape
4. Start of file tape mark

10-61. MTU operations that can be performed offline using the microprogrammed controller (MPC) are determined by the MPC program installed by the

1. operator
2. computer
3. manufacturer
4. maintenance technician

10-62. What functional area of a magnetic tape unit decodes external function words from the computer?

1. System control panel
2. Maintenance panel
3. Magnetic tape transport
4. Control unit

10-63. The MPC transmits data via which of the following data buses?

1. Source bus only
2. Destination bus only
3. Source and destination buses
4. ROM bus only

10-64. Which of the following control unit functions are NOT performed by the MPC?

1. Frame count checking for lost frames
2. Start/stop delay initiation
3. Read/write signal amplification
4. Search operations comparisons

10-65. Which of the following components contains controls and indicators for manual offline operations?

1. The maintenance panel
2. The system control panel
3. The magnetic tape transport
4. The microprogrammed controller

10-66. Which of the following components contains the controls and indicators for primary power and tape transport manual control?

1. The maintenance panel
2. The system control panel
3. The magnetic tape transport
4. The microprogrammed controller

10-67. Of the following operations, which one is NOT performed by the magnetic tape transport (MTT) control section?

1. Provides control signals for manual operations of the MTT
2. Acts as an interface for MTU control signals and status responses
3. Sends signals to light the MTT switch panel indicators
4. Provides timing pulses and a servo-movement control signal to the capstan

10-68. The direction and speed of the supply and take-up servo motors are controlled by which of the following methods?

1. The size of the tape loop in the vacuum column
2. The direction and speed of the capstan motor
3. The capstan tachometer
4. The function being performed

10-69. Which of the following MTT sections controls the speed and direction of tape movement?

1. Air control solenoids
2. Capstan servo-control
3. Supply reel servo-control
4. Take-up reel servo-control

10-70. The supply and take-up reel servo-driven hubs attempt to maintain the tape loops in which of the following positions as shown in figure 10-20?

1. Above sensor A
2. Below sensor D
3. Between sensors B and C
4. Between sensors A and D

10-71. The speed and direction of the servo-driven hubs are controlled by all of the following conditions except which one?

1. Capstan direction and velocity
2. Reel tachometer input
3. Vacuum/pressure sensors in the buffer columns
4. Read or write operation being performed

10-72. Which of the following diagnostic programs are controlled by the MPC ROM?

1. POFA
2. PEFT
3. Internal diagnostics
4. All of the above

10-73. Which of the following diagnostic programs are run under the control of the operational program?

1. POFA
2. PEFT
3. Internal diagnostics
4. All of the above

10-74. Which of the following POFA tests checks the ability of the MTU to respond to computer commands and to provide status and error condition information to the computer?

1. The duplex test
2. The extended operation test
3. The function and format test
4. The transport compatibility test

10-75. Which of the following POFA tests checks the MTU's ability to read the same tape on several MTTs?

1. The duplex test
2. The extended operations test
3. The function and format test
4. The transport compatibility test

ASSIGNMENT 11

Textbook Assignment: "Magnetic Disk Storage," chapter 10, pages 10-1 through 10-21.

11-1. Magnetic disks are generally used as which of the following types of storage?

1. Main memory
2. Secondary storage
3. Tertiary storage

11-2. The original fixed disk had which of the following maximum capacities?

1. 5 megabytes
2. 10 megabytes
3. 20 megabytes
4. 50 megabytes

11-3. The first floppy disks had a diameter of (a) what number of inches and a maximum capacity of(b) how many kilobytes?

1. (a) 5 (b) 180
2. (a) 5 (b) 360
3. (a) 8 (b) 180
4. (a) 8 (b) 360

11-4. The top and bottom surfaces of a removable disk pack are usually used for what purpose?

1. Data storage
2. Protection
3. Servo data
4. Indexing

11-5. Fixed disks have which of the following characteristics?

1. They are small sealed units with one or more platters
2. They are easily removed from the computer
3. They are only used with mainframe computers
4. They are not broken

11-6. The 5.25-inch floppy disk is available with which of the following densities?

1. 360K only
2. 720K only
3. 1.2M only
4. 360K, 720K, and 1.2M

11-7. The 3.5-inch floppy disk is available with which of the following densities?

1. 360K only
2. 720K only
3. 1.44M only
4. 720K and 1.44M

11-8. Formatting a disk performs which of the following operations?

1. Writes tracks only
2. Writes sectors only
3. Writes cylinders only
4. Writes tracks and sectors

11-9. Concentric rings used to store data on disk are called

1. bytes
2. tracks
3. records
4. cylinders

11-10. Track 00 is physically located on a disk's recording surface in which of the following places?

1. Top track
2. Bottom track
3. Innermost track
4. Outermost track

11-11. A cylinder address number is comprised of which of the following numbers?

1. Cylinder number only
2. Track number only
3. Sector number only
4. Cylinder number, sector number, and head number

11-12. In a personal computer, which of the following data management areas is NOT created by the DOS[1] format program?

1. Root directory
2. Subdirectory
3. Disk boot sector
4. File allocation table

11-13. A new fixed disk installed in a personal computer needs to have what operation(s), if any, run before it is ready to store data?

1. Format only
2. High-level format only
3. Format and high-level format
4. None; new disks are ready to run

11-14. In a personal computer using DOS version 5, the root directory of a 40 megabyte fixed disk can have what maximum number of entries?

1. 128
2. 256
3. 512
4. 640

11-15. The DOS directory system is a file system that enables DOS to manage files.

1. True
2. False

11-16. In DOS, the maximum number of characters in a file name is

1. 8
2. 9
3. 10
4. 11

11-17. In DOS, the maximum number of characters in a file extension is

1. one
2. two
3. three
4. four

11-18. Using DOS on a personal computer, a total of how many bytes comprise a directory entry?

1. 32
2. 48
3. 64
4. 80

[1] References to DOS refer to Microsoft® Disk Operating Systems (MS-DOS®).

11-19. Which of the following parameters is NOT part of the DOS file allocation table (FAT) entry?

1. A bad cluster code written during formatting
2. A DOS cluster available for storage
3. The file name stored in that DOS cluster
4. An end of the file code

11-20. On a 5.25-inch floppy disk, which of the following materials is used as the magnetic coating?

1. Chromium dioxide only
2. Iron oxide only
3. Cobalt only
4. Iron oxide or cobalt, depending on the density of the disk

11-21. The index hole on a 5.25-inch soft sectored floppy disk is used to indicate the

1. start of sector 1 of each track
2. start of track 1
3. start of each sector
4. end of the data storage area of the disk

11-22. To protect a 5.25-inch floppy disk from being written on, which of the following actions should you take?

1. Ensure the write enable notch is not obstructed
2. Cover the write enable notch with a piece of tape
3. Format the disk as read only
4. Disable the write circuitry on the disk drive

11-23. To allow for greater densities on a 3.5-inch floppy disk, the plastic cover provides what function, if any?

1. It stabilizes the disk as the disk spins
2. It makes it harder to damage the disk
3. It allows for greater disk speeds
4. None; it serves no function in increasing disk density

11-24. When handling a 3.5-inch floppy disk, what feature, if any, eliminates the need for you to keep the disk in a disk jacket?

1. The rigid plastic case
2. The spring-loaded metal shutter
3. The exposed media access hole
4. None; you should always store a 3.5-inch disk in a jacket

11-25. What action, if any, is necessary to write data on a 3.5-inch disk?

1. Ensure the write enable slide is positioned so you can see a hole in the disk case
2. Ensure the write enable slide is positioned so that no hole is visible through the disk case
3. Ensure the disk has not been formatted
4. None; no action is necessary to write on a 3.5-inch disk

11-26. The presence of a media indicator hole in a 3.5-inch disk case indicates what about the disk?

1. It has been properly inserted in the drive
2. It can be formatted as a 720K disk only
3. It can be formatted as a 1.44M disk
4. It has been preformatted

11-27. The drive motor in a 5.25-inch, 1.2M disk drive spins at which of the following speeds?

1. 200 rpm
2. 260 rpm
3. 300 rpm
4. 360 rpm

11-28. The drive motor on most half-height floppy disk drives is which of the following types of motors?

1. Gear box drive
2. Direct drive
3. Servo drive
4. Belt-drive

11-29. To adjust the speed of some older fill-height, belt-driven floppy disk drives, which of the following actions should be performed?

1. Replace the drive belt only
2. Observe the data on the floppy disk with an oscilloscope and adjust for maximum signal
3. Observe the drive speed frequency with an oscilloscope and adjust for proper speed
4. Observe the strobo-disk under a fluorescent light and adjust the speed until the strobo-disk spokes appear to be stationary

11-30. Which of the following is NOT a function of the drive electronics circuit board?

1. To control the electromechanical parts of the disk drive
2. To control the operation of the read/write heads
3. To interface the disk drive to the computer
4. To interface the disk drive to the disk controller

11-31. A 4-pin, in-line connector on the drive electronics circuit board of a floppy disk drive serves which of the following functions?

1. To provide power to the drive
2. To provide control signals to the drive
3. To transfer serial data from the heads to the drive controller
4. To transfer serial data from the disk controller to the write head

11-32. The head actuator assembly in a floppy disk drive has what purpose?

1. To retract the heads so the disk can be removed from the drive only
2. To move the heads to the proper position on the disk
3. To enable the write heads
4. To enable the read heads

11-33. The two read/write heads in a floppy disk drive move independently of one another.

1. True
2. False

11-34. Which of the following is a description of the construction of the read/write heads in a floppy disk drive?

1. They are made of a hard ferrous material with electromagnetic coils for reading and writing
2. They are made of a soft ferrous material with electromagnetic coils for reading and writing
3. They are made of plastic with electromagnetic coils for reading and writing
4. They are made of a hard ferrous material only and do not need any coils

11-35. The write head is centered between two erase heads for which of the following reasons?

1. To erase the previous data before new data is written
2. To cancel the write current when a read operation is performed
3. To ensure that data being written does not spill over to adjacent tracks
4. To erase the previous data after the new data is written

11-36. The number of tracks per inch that can be reliably written on a disk is called the

1. linear coercivity
2. longitudinal coercivity
3. linear density
4. longitudinal density

11-37. The number of bits per inch that can be reliably written on a track is called the

1. linear coercivity
2. longitudinal coercivity
3. linear density
4. longitudinal density

11-38. The strength of the magnetic field required to properly record data on a magnetic medium is referred to by which of the following terms?

1. Coercivity
2. Oersteds
3. Density
4. Ferrous

11-39. Oersteds are used to make what type of measurements?

1. Magnetic field strength
2. Permeability of a ferrous material
3. Magnetic density
4. Magnetic polarity

11-40. A 5.25-inch floppy disk that is labeled as DSDD has a maximum data capacity of

1. 180 kilobytes
2. 360 kilobytes
3. 720 kilobytes
4. 1.2 megabytes

11-41. The track width of a 3.5-inch floppy disk is

1. 0.l15 mm
2. 0.16 mm
3. 0.33 mm
4. 0.45 mm

11-42. Reading a 5.25-inch, 360K disk in a 1.2M disk drive will cause what problem, if any?

1. The disk drive will read the disk with massive read errors
2. The disk drive will be unable to read the disk at all
3. The 360K disk will not fit into a 1.2M disk drive
4. No problem; the disk drive will read the disk normally

11-43. Using a 1.2M, 5.25-inch drive to write data on a 5.25-inch, 360K disk that was originally created in a 360K disk drive will result in what problem, if any?

1. The 1.2M drive will not write on a 360K disk
2. The 360K disk will not fit into a 1.2M drive
3. The 1.2M drive will write a narrow track through the wider track on the 360K disk, which could result in read errors
4. None; no problem will be encountered

11-44. Formatting a 5.25-inch, 360K DSDD disk as a 1.2M HD disk will result in what problem, if any?

1. The disk will not format because the DOS format program will check the media indicator on the disk and not permit the operation
2. The disk will appear to format correctly, but will be unreliable because of the increased write current required for high density disks
3. The disk will appear to format correctly, but will be unreliable because of the decreased write current required for high density disks
4. None; no problem will be encountered

11-45. Formatting a 720K DSDD, 3.5-inch floppy disk as a 1.44M will result in what problem, if any?

1. The disk will not format because the DOS format program will check the media indicator on the disk and not permit the operation
2. The disk will appear to format correctly, but will be unreliable because of the increased write current required for high density disks
3. The disk will appear to format correctly, but will be unreliable because of the decreased write current required for high density disks
4. None; no problem will be encountered

11-46. A high-density disk can be used in a low-density drive with no problems.

1. True
2. False

11-47. The drive select jumper on a floppy disk drive's electronics card is used to select which of the following functions?

1. Drive type
2. Drive density
3. Drive address
4. Drive operating speed

11-48. When installing a floppy drive with a straight two-drive daisy chain cable, you should connect Drive A to (a) what connector and set the drive select jumper to (b) what drive?

1. (a) End (b) DS0
2. (a) End (b) DS1
3. (a) Middle (b) DS0
4. (a) Middle (b) DS1

11-49. The twist in a floppy disk cable was designed for which of the following reasons?

1. To ease floppy drive installation by setting all drives to DS1
2. To ease floppy drive installation by setting all drives to DS0
3. To ease floppy drive installation by setting drive A to DS0 and drive B to DS1
4. To confuse floppy drive installation

11-50. The twist in a floppy drive cable cross connects which of the following pins?

1. 10 through 16 only
2. 10 through 20
3. 20 through 26 only
4. 20 through 30

11-51. The terminating resistor on a floppy drive is used to supply the proper load to (a) what device and should be connected on the floppy disk at (b) what point on the cable?

1. (a) Computer (b) middle
2. (a) Computer (b) end
3. (a) Disk controller (b) middle
4. (a) Disk controller (b) end

11-52. The media sensor detects a hole for which of the following disks?

1. 5.25-inch, 360K disks
2. 5.25-inch, 1.2M disks
3. 3.5-inch, 720K disks
4. 3.5-inch, 1.44M disks

11-53. It is impossible to recover data on a disk that has been damaged.

1. True
2. False

11-54. Large magnetic disk memory sets are generally used with which of the following computers?

1. Mainframe computers
2. Minicomputers
3. Personal computers only
4. Microcomputers

11-55. The diameter of most magnetic disk packs is

1. 10 inches
2. 12 inches
3. 14 inches
4. 16 inches

11-56. The top and bottom platters of most disk packs are used for which of the following functions?

1. To store data
2. To provide position data
3. Both 1 and 2 above
4. To provide protection to the pack

11-57. The servo surface of a disk pack is used for which of the following functions?

1. To control the movement of the read/write heads
2. To maintain alignment of the read/write heads over the proper track
3. Both 1 and 2 above
4. To provide additional data storage area

11-58. When the summing of dipole bits on the disk servo surface is equal to zero volts, which of the following conditions exist?

1. The heads are on an odd numbered track only
2. The heads are on an even numbered track only
3. The heads are between tracks
4. The heads are centered on a track

11-59. On a typical disk memory set's operator panel, which of the following conditions is NOT indicated by the READY indicator?

1. The disk drive address
2. The disk is up to operating speed
3. The heads are properly loaded
4. No-fault conditions are present

11-60. On a disk memory set's status/maintenance panel, a fault code of 5 indicates what fault condition?

1. Voltage fault
2. Seek error
3. Multiple heads selected fault
4. No heads selected fault

11-61. The FORMAT WRITE PROTECT switch on a disk memory unit's status panel protects the disk from being inadvertently formatted by which of the following format commands?

1. Commands from the computer only
2. Commands from the status/maintenance panel only
3. Commands from the computer and the status/maintenance panel

11-62. The functions performed by the disk memory set's controller microprocessor are governed by which of the following methods?

1. The firmware stored in a ROM
2. The software in the CDS computer
3. The firmware stored in the RAM
4. The software stored in the RAM

11-63. The buffer memory in the disk memory set's computer is used for which of the following functions?

1. To prevent data from being read from the disk during a write operation
2. To prevent data from being written on the disk during a read operation
3. To prevent the loss of data when reading or writing
4. To hold the external function from the computer

11-64. A disk memory set is capable of reading and writing data on the same disk at the same time.

1. True
2. False

11-65. A single disk memory set controller is capable of controlling a total of how many drives?

1. One
2. Two
3. Three
4. Four

11-66. In a disk memory set's controller to disk drive interface, each drive is connected to the controller by which of the following means?

1. A daisy chained A cable only
2. A daisy chained B cable only
3. Both a daisy chained A and a daisy chained B cable
4. A daisy chained A cable and a unique B cable

11-67. The A cable in a disk memory set's controller to drive interface is used for which of the following functions?

1. Interrupt signal processing only
2. Send timing signals for read/write operations only
3. Microprocessor control of the drives
4. Data interface between the drive and controller

11-68. In a disk memory set, converting 16-bit parallel data into a serial NRZ pulse train is a function of which of the following areas?

1. Controller microprocessor
2. Controller buffer memory
3. Data bus control unit
4. Disk control logic

11-69. In a disk memory set, the data bus control unit gives the highest priority to which of the following transfer requests?

1. Disk control logic and buffer memory
2. Processor input and output holding register
3. Input/output channel
4. Computer generated input data

11-70. In a disk memory set, data is written on the disk using which of the following encoding methods?

1. Phase encoding
2. Non-return-to-zero
3. Non-return-to-zero-indiscrete
4. Modified frequency modulation

11-71. Which of the following speeds is the minimum speed required for the heads of a disk memory set to load?

1. 3,000 rpm
2. 3,100 rpm
3. 3,200 rpm
4. 3,600 rpm

11-72. In a disk memory set, if the disk drive motor's speed drops below 3,100, which of the following events will occur?

1. The heads will crash into the disk
2. The heads will automatically unload or retract
3. The disk memory set will automatically turn off power
4. The disk memory set will continue to operate normally

11-73. The speed of the drive motor in a disk memory set is sensed by which of the following devices?

1. A tachometer
2. A magnetic switch
3. An optical switch
4. A laser switch

11-74. The static ground spring mounted on the lower end of the spindle assembly serves which of the following functions?

1. Protects the disk from a buildup of static electricity
2. Provides power to the spindle
3. Maintains proper pressure of the spindle and the disk
4. Provides a static charge to the spindle

11-75. Which of the following assemblies are NOT part of the actuator assembly?

1. Carriage and voice coil assembly
2. Rail bracket assembly
3. Head/arm assemblies
4. Magnet assembly

ASSIGNMENT 12

Textbook Assignment: "Magnetic Disk Storage", chapter 10—Continued, pages 10-21 through 10-33; and "CD-ROM Storage", chapter 11, pages 11-1 through 11-7.

12-1. The velocity transducer in a disk memory set drive unit helps control the acceleration and deceleration of which of the following parts?

1. The drive motor
2. The spindle assembly
3. The carriage assembly
4. The operating frequency of the system clock

12-2. The polarity and amplitude of the voltage induced into the velocity transducer coil by the transducer core indicates which of the following movements are occuring?

1. The speed the disk is rotating
2. The speed of the carriage assembly only
3. The direction of travel of the carriage assembly only
4. The speed and direction of the carriage assembly movement

12-3. The servo circuit used to position the read/write heads in a disk memory set is centered on the right track when the error voltage is equal to

1. -1 volt
2. 0 volts
3. +1 volt
4. +5 volts

12-4., The feedback signal in the velocity transducer servo circuit performs which of the following functions?

1. It is used to move the carriage faster
2. It tells the servo circuit when the desired location is reached
3. It opposes the position error and dampens carriage movement
4. It moves the heads by one track

12-5. If a disk has an error on its servo surface, it is possible to rewrite the servo surface.

1. True
2. False

12-6. The number of sectors per track that will be written on a disk memory set disk pack is selectable by what means, if any?

1. The sector select switch only
2. A set sector size command from the computer only
3. Either the sector select switch or a set sector size command from the computer; the result is the same
4. Not selectable, the number of sector per track is fixed

12-7. When a disk pack is formatted, the locations of the tracks are controlled by which of the following factors?

1. The prerecorded tracks on the servo disk surface
2. The smallest increment the actuator assembly can move the heads
3. An operator controlled entry of number of tracks
4. A computer command designating number of tracks per inch

12-8. When a magnetic disk set is operating normally, what is the relationship, if any, between the position of the heads and the disk's surface?

1. The heads physically contact the disk
2. The heads are held above the disk surface by the head arm springs
3. The heads float above the surface of the disk on a cushion of air
4. None; the position of the heads does not affect disk operation

12-9. Which of the following procedures will help prevent damage to the disk pack?

1. Store the disk pack on its side
2. Store the disk pack in an area where large magnetic fields exist
3. Never reassemble the disk pack canister if it is empty
4. Never touch the disk pack's recording surfaces

12-10. The term fixed hard disk system refers to which of the following devices?

1. A hard disk system that is not broken
2. A hard disk system in which the disk is in a sealed case and inaccessible to the user
3. A hard disk system in which the hard disk is contained in a removable cartridge
4. A hard disk system that cannot be used with a microcomputer

12-11. The head disk assembly of a fixed disk system usually contains all of the following parts except which one?

1. The heads
2. The disk platters
3. The head actuator
4. The disk controller

12-12. The maximum number of platters that a half-height, fixed disk system may contain is

1. five
2. six
3. seven
4. eight

12-13. In the manufacture of a fixed hard disk, which of the following processes for applying the magnetic material is similar to the process used in creating semiconductors?

1. Sputtering
2. Platting
3. Electroplating
4. Coating

12-14. Which of the following materials is most commonly used as a base for fixed hard disk platters?

1. Polyester film
2. Aluminum alloy
3. Iron alloy
4. Plastic

12-15. Having the thinnest magnetic media applied to the disk platters has which of the following advantages?

1. A smaller space on the disk is required to reliably store data
2. The head can fly closer to the disk
3. A smaller magnetic field strength is required to reliably store data
4. All of the above

12-16. In a magnetic disk system, reducing the flying height of the heads has which of the following advantages?

1. Requires a stronger current to accurately write on the disk
2. Reduces the signal to noise ratio, increasing the accuracy of the disk
3. Increases the signal to noise ratio, increasing the accuracy of the disk
4. Increases the physical space on the disk required to store data

12-17. The U-shaped groove in the bottom of a thin film head is used for what function?

1. To regulate the air pressure and control the flying height of the head
2. To direct the magnetic field from the head onto the disk when writing
3. To channel the magnetic field from the disk to the head when reading
4. To hold the erase head

12-18. The mechanical system that moves the heads across the disk surface is known as the

1. head drive system
2. head arm
3. head actuator
4. disk drive motor

12-19. A motor that moves in precise detents when a drive signal is applied is known as a

1. voice coil motor
2. stepper motor
3. servo motor
4. synchro

12-20. Which of the following actuators could suffer a loss of data because of variations in temperature?

1. Voice coil
2. Stepper motor
3. Servo motor
4. Synchro

1.2-21. For proper positioning of the heads, which of the following actuators requires a dedicated servo surface or servo signal embedded in the sector gaps?

1. Voice coil
2. Stepper motor
3. Servo motor
4. Synchro

12-22. The speed of the spindle motor in a fixed disk is controlled by which of the following devices?

1. An optical sensor
2. A tachometer only
3. A feedback loop only
4. A tachometer and feedback loop

12-23. Timing and synchronization between a fixed disk drive and the drive controller are accomplished by which of the following means?

1. A clock on the controller
2. A clock on the disk drive logic board
3. Special timing signals on the disk
4. Data and flux reversal pulses

12-24. Which of the following data encoding methods is NOT used with fixed disk drives?

1. Modified frequency modulation
2. Frequency modulation
3. Run length limited
4. Non-return-to-zero indiscrete

12-25. A fixed disk system that uses frequency modulation to encode data would store the byte 10100001 as which of the following codes (P=pulse, N=no pulse)?

1. PPPPNPNPNPPPPPNP
2. PPPNPPPNPNPNPNPP
3. NPPPNPPPPPPPPPNP
4. NPNPNPNPNPNPNPNP

12-26. Which of the following data encoding methods groups bits together and uses a table to determine what code is written on the disk?

1. Non-return-to-zero
2. Frequency modulation
3. Modified frequency modulation
4. Run length limited

12-27. A fixed disk system using modified frequency modulation will encode a logic ZERO that is preceded by a logic ONE in which of the following ways?

1. No pulse followed by a pulse
2. A pulse followed by no pulse
3. Two no-pulse periods
4. Two pulses

12-28. Which of the following encoding methods will increase by 50 percent the data density and transfer rate of a fixed disk system?

1. Run length limited
2. Non-return-to-zero
3. Frequency modulation
4. Modified frequency modulation

12-29. The encoding method used to write data on a fixed disk is determined by which of the following means?

1. The application software installed in the computer
2. The disk operating system (DOS) installed in the computer
3. The disk controller
4. The manufacturer of the disk drive

12-30. The run length limited encoding method can be used with any fixed disk drive.

1. True
2. False

12-31. A fixed disk's interleave factor is the relationship between what two items?

1. The physical sectors and the logical sectors of a track
2. The disk drive and the disk controller
3. The disk drive and the encoding method used to store data
4. The disk drive and the computer

12-32. Interleaving a fixed disk has which of the following effects?

1. Increases data density on the disk
2. Decreases data density on the disk
3. Increases data retrieval and transfer time
4. Decreases data retrieval and transfer time

12-33, On a fixed disk with nine sectors per track and an interleave factor of 4:1, which of the following would be the physical sector numbering?

1. 1,9,7,5,3,2,8,6,4
2. 1,8,6,4,2,9,7,5,3
3. 1,2,3,4,5,6,7,8,9
4. 1,4,8,3,7,2,6,5,9

12-34. Which of the following interleave factors would provide the fastest data transfer rate?

1. 4:1
2. 3:1
3. 2:1
4. 1:1

12-35. Which of the following drive interfaces is a smart interface that can disconnect itself from the computer while it processes computer requests?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-36. Which of the following interfaces requires that a set-up program in the computer be run to describe the fixed disk drive's characteristics?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-37. Which of the following interfaces has the data encoder/decoder on the controller card?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-38. Which of the following interfaces could damage a disk if a low-level format is attempted?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-39. Which of the following interfaces is actually a host adapter, capable of interfacing up to eight devices?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-40. Which of the following interfaces is capable of formatting a drive up to 60 sectors per track and can support a 1:1 interleave?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-41. Which of the following interfaces is now being manufactured on the motherboards of personal computers?

1. ST-506/412
2. IDE
3. ESDI
4. SCSI

12-42. While performing a low-level format on a fixed disk system, which of the following operations are executed by the format program?

1. Checks for bad tracks and marks them with a checksum code
2. Writes the sectors and tracks on the disk
3. Both 1 and 2 above
4. Divides the disk into DOS partitions

12-43. Write precompensation helps eliminate data errors by what method, if any?

1. Increasing the number of bytes per sector as the heads move toward the inner tracks of the disk
2. Decreasing the number of bytes per sector as the heads move toward the inner tracks of the disk
3. Changing the spacing of the magnetic fields as the heads move toward the inner tracks of the disk
4. None; write precompensation does not help eliminate data errors

12-44. Decreasing the amount of current used to write data on the inner tracks of the disk is known as

1. write precompensation
2. reduced write current
3. low-level disk format
4. disk partitioning

12-45. Write precompensation and reduced write current are necessary for which of the following reasons?

1. The inner tracks of the disk are larger than the outer tracks
2. The inner tracks of the disk are smaller than the outer tracks
3. The disk spins faster when reading the inner tracks
4. The disk spins slower when reading the inner tracks

12-46. Running the DOS FDISK program on a fixed disk in a personal computer performs which of the following functions?

1. Prepares the DOS boot sector on the disk
2. Creates the file allocation table on the disk
3. Writes the sectors on the disk
4. Creates the root directory

12-47. When you erase a file on a disk in a personal computer, which of the following operations does DOS perform?

1. Finds the file and writes all ZEROS to the sectors on the disk that the file occupied
2. Finds the file and writes all ONES to the sectors on the disk that the file occupied
3. Changes the code in the FAT to indicate the clusters the file occupied are available for data storage
4. Changes the code in the root directory to indicate the file is erased

12-48. A virus may only infect your personal computer if it loaded in which of the following types of files?

1. A .COM or .EXE file only
2. A data file only
3. The master boot record only
4. Any file loaded when doing a low-level disk format

12-49. Which of the following viruses embeds itself into other programs and may contain other types of viruses?

1. Worm
2. Trojan horse
3. Logic bomb

12-50. Which of the following viruses tries to endlessly copy itself on a fixed disk, tying up the computer and eventually overloading your disk?

1 Worm
2. Trojan horse
3. Logic bomb

12-51 Which of the following viruses only executes itself if a certain set of conditions is met?

1. Worm
2. Trojan horse
3. Logic bomb

12-52. Which of the following viruses is generally the most destructive to a system?

1. Worm
2. Trojan horse
3. Logic bomb

12-53. Which of the following is NOT a precaution in preventing virus infections?

1. Making regular back-ups
2. Using only authorized software
3. Periodically checking the size of the COMMAND.COM file
4. Using software from an unauthorized source

12-54. It is usually possible to recover some data from a fixed disk even after a severe head crash.

1. True
2. False

12-55. In caring for a fixed disk, which of the following precautions is NOT recommended?

1. Limit the number of times the system is turned on and off
2. Avoid eating, drinking, and smoking around computer systems
3. Clean the fixed disk on a regular basis
4. Perform the low-level format of a fixed disk in the position and temperature that the disk will be used

12-56. A multimedia CD-ROM is a disc that contains which of the following types of information?

1. Data files only
2. Digitized audio only
3. Digitized video only
4. Data files, digitized audio, and digitized video

12-57. Data is stored on a CD-ROM by which of the following methods?

1. Magnetizing spots on the disc
2. Etching tiny ones and zeros on the disc
3. Punching tiny holes through the disc
4. Etching pits between lands on the disc

12-58. The diameter of a compact disc is

1. 120 mm
2. 130 mm
3. 140 mm
4. 150 mm

12-59. The data area of a CD-ROM consists of which of the following sections?

1. The table of contents, the lead-out area, and the clamping area
2. The table of contents and the program area only
3. The table of contents, the program area, and the lead-out area
4. The lead-out area and the clamping area

12-60. CD-ROM storage has all of the following advantages except which one?

1. Fast access time
2. Storage capacity of over 540 megabytes of information
3. Extremely durable
4. Can store a mixture of digital information

12-61. Data is stored on a CD-ROM disc in which of the following ways?

1. In a series of separate tracks only
2. In a series of separate tracks divided into sectors
3. In a continuous spiral track divided into sectors
4. In a continuous spiral sector divided into tracks

12-62. Which of the following is a description of the operation of a drive that uses constant linear velocity?

1. The speed of the disc decreases as the read head moves toward the outer edge of the disc
2. The speed of the disc increases as the read head moves toward the outer edge of the disc
3. The speed of the disc remains constant throughout the range of the read head
4. The physical sizes of the sectors on the spiral track increase toward the outer edge of the disc

12-63. Sectors on a CD-ROM are accessed by which of the following address forms?

1. Track, sector, head
2. Minute: second: sector
3. Hour: minute: sector
4. Cylinder: sector

12-64. When a CD-ROM disc is manufactured. the data is written on the disc in which of the following formats?

1. Eight-to-fourteen modulation
2. Modified frequency modulation
3. Run length limited 2,7
4. Non-return-to-zero

12-65. The laser used in the optical head of a CD-ROM drive emits light in which of the following bands?

1. Ultraviolet
2. Visible spectrum
3. Infrared
4. White

12-66. The collimating lens in a CD-ROM drive's optical head is used to perform which of the following functions?

1. To focus the laser beam on the disc
2. To reduce the divergence of the laser beam
3. To focus the laser beam on the photodector circuit
4. To reduce the intensity of the laser beam

12-67. The final step in focusing the laser beam on the disc is accomplished by which of the following items?

1. Optical head
2. Objective lens
3. Collimating lens
4. Plastic coating on the disc

12-68. Splitting the reflected laser beam and directing the split beams to a set of photodiodes is used in which of the following functions?

1. Ensuring the disc is rotating at the proper speed
2. Maintaining proper tracking and focus
3. Detecting data on the disc
4. Both 2 and 3 above

12-69. The control section decodes the eight-to-fourteen data read from a disc using what method, if any?

1. Checking the data for parity errors
2. Using the data to address a ROM for the proper byte
3. Adding the data to a set value to find the proper byte
4. None; the data does not need to be decoded

12-70. The turntable must rotate so that the data track passes over the optical head at which of the following speeds?

1. 1.3 meters per second
2. 1.5 meters per second
3. 1.7 meters per second
4. 1.9 meters per second

12-71. The interface section provides control for which of the following functions?

1. The transfer of data from the CD-ROM drive to the computer
2. The receipt of data from the computer to be written on the disc
3. Both 1 and 2 above
4. The transfer of data from the disc to the control section of the drive

12-72. Storing information on a large database on CD-ROM has which of the following advantages?

1. Reduces the amount of paper storage required
2. Enables the information to be quickly retrieved
3. Allows the information to be quickly cross-referenced
4. All of the above

12-73. In a multimedia or CD-I application, the different types of data are distinguished by which of the following methods?

1. The control section analyzes the data to determine what it is
2. All data is sent to the computer and the computer determines what it is
3. A code is written at the start of each sector to identify the type of data
4. The disc is divided into specific areas to store audio, video, and program information

ASSIGNMENT 13

Textbook Assignment: "Printers," chapter 12, pages 12-1 through 12-15; and "Data Conversion Devices and Switchboards," chapter 13, pages 13-1 through 13-5.

13-1. Printers that use pins or hammers to strike an inked ribbon to transfer characters to paper are classified as which of the following types?

1. Impact printers
2. Nonimpact printers
3. Thermal printers
4. Laser printers

13-2. A predefine table of characters that can be printed by a printer is known as the

1. print head
2. character set
3. printer code
4. character library

13-3. The 8-bit printer codes that define the alphanumeric characters of the standard English alphabet are contained in which of the following character sets?

1. American National Standards Institute (ANSI) character set
2. Computer Institute character set
3. Institute of Electrical and Electronics Engineers (IEEE) standard character set
4. American National Standard Code for Information Interchange (ASCII) character set

13-4. Standard printer character codes contain a total of how many data bits?

1. Five
2. Six
3. Seven
4. Eight

13-5. The ASCII decimal value 66 represents which of the following characters?

1. A
2. a
3. B
4. b

13-6. The ASCII decimal values 128 through 255 are used for which, if any, of the following functions?

1. Alternate character set
2. Control codes
3. Lowercase letters of the main character set
4. None of the above; they are undefined and have no meaning

13-7. The type of characters that a printer can print is dependent on which of the following factors?

1. The type of printer only
2. The software only
3. The type of printer and the software
4. The type of computer

13-8. A printer driver is a software routine that performs which of the following functions?

1. Defines the printer capabilities to the software
2. Defines the character set to the printer
3. Defines the graphics capability of the printer
4. All of the above

13-9. A separate printer driver is required for each type of printer that a software program will support.

1. True
2. False

13-10. The original ASCII codes contained what total number of control codes?

1. 16
2. 32
3. 48
4. 54

13-11. Which of the following ASCII codes (in decimal) will result in the printer performing a carriage return?

1. 10
2. 12
3. 13
4. 27

13-12. The ASCII ESCAPE code (27) when combined with other characters and sent to a printer is used for which of the following functions?

1. To tell the printer to start printing
2. To initiate enhanced features of many printers
3. To stop all printer operations
4. To change the printer driver of the software

13-13. Printing each letter or character on a line based on the character's actual size is known as which of the following printer spacing methods?

1. Proportional spacing
2. Prearranged spacing
3. Relative spacing
4. Fixed spacing

13-14. A font describes which of the following characteristics of the type?

1. Style of the typeface only
2. Size of the typeface only
3. Both the style and size of the typeface
4. All the characters a printer is capable of printing

13-15. The printer measure that is equal to 1/72 inch is known by what term?

1. Elite
2. Pica
3. Pitch
4. Point

13-16. Which of the following print modes is used to print text across the length of a standard size sheet of paper?

1. Landscape mode
2. Portrait mode
3. Picture mode
4. Graphics mode

13-17. Which of the following is the most widely used serial interface between a personal computer and a printer?

1. EIA interface
2. Centronics® interface
3. RS-232 interface
4. RS-323 interface

13-18. Parallel-to-serial data conversion for use in serial interfaces of personal computers is accomplished by which of the following circuits?

1. RS-232 interface
2. Universal asynchronous receiver/transmitter (UART)
3. Centronics interface
4. Serial converter

13-19. In a serial interface that uses software handshaking, what minimum number of pins must be connected?

1. Five
2. Two
3. Three
4. Four

13-20. The Centronics parallel interface uses what (a) connector at the computer end of the cable and what (b) connector at the printer end of the cable?

1. (a) 36-pin Centronics
   (b) 36-pin Centronics
2. (a) 36-pin Centronics
   (b) DB-25 subminiature
3. (a) DB-25 subminiature
   (b) DB-25 subminiature
4. (a) DB-25 subminiature
   (b) 36-pin Centronics

13-21. The Centronics parallel interface is which of the following types of interface between the computer and the printer?

1. 8-bit, one-way
2. 8-bit, two-way
3. 16-bit, one-way
4. 16-bit, two-way

13-22. Which of the following is NOT a function of the control panel on a printer?

1. Activating the print head
2. Providing operator selectable fonts
3. Initiating the self-test function
4. Controlling whether the printer is online or offline

13-23. Continuous paper with perforated holes on each side is designed to be used with which of the following paper-feed methods?

1. Friction feed
2. Tractor feed
3. Sheet feeder
4. Pressure feed

13-24. The paper-feed motor in a tractor-feed printer is usually which of the following types of motors?

1. Stepper
2. Synchro
3. Servo
4. Reduction

13-25. Which of the following paper-feed methods uses one or more pressure rollers to move paper through the printer?

1. Tractor feed
2. Friction feed
3. Sheet feeder
4. Both 2 and 3 above

13-26. Which of the follow lists includes only impact printers?

1. Chain, band, and laser
2. Drum, dot matrix, and inkjet
3. Inkjet, laser, and daisy wheel
4. Chain, band, drum, dot matrix, and daisy wheel

13-27. The maximum number of characters that a drum printer can print on one line is determined by which of the following factors?

1. The type of software being used
2. The number of rows on the drum
3. The number of columns on the drum
4. The type of computer being used

13-28. A drum printer has which of the following number of hammers?

1. One for each column on the drum
2. One for each line the printer is capable of printing
3. One for each letter of the alphabet and seven for special characters
4. Two for each letter of the alphabet (one for uppercase and one for lowercase) and seven for special characters

13-29. The quality of print produced by a dot matrix printer is directly related to which of the following factors?

1. The number of print wires in the print head
2. The number of characters being printed
3. The size of the print head
4. The type of font being printed

13-30. The print wires in a dot matrix print head are driven by which of the following devices?

1. A relay
2. One solenoid that drives all the print wires
3. An individual solenoid for each print wire
4. A hi-stable multivibrator

13-31. A dot matrix print head is mounted on a heat sink for which of the following reasons?

1. To dissipate heat generated by the moving print wires
2. To dissipate heat generated by the solenoid drivers
3. To dissipate heat generated by the printer's power supply
4. To heat up the print wires to the proper operating temperature

13-32. A nine-pin dot matrix print head prints in near letter quality mode by making two passes for each line, advancing the paper which of the following distances before the second pass?

1. One-half line
2. One-half letter space
3. One-half dot space
4. One dot space

13-33. A 24-pin print head prints near letter quality faster and with greater resolution than a 9-pin print head for which of the following reasons?

1. It prints two characters at a time
2. It prints larger dots
3. It prints more dots per character only
4. It has two columns of offset print wires and prints smaller dots

13-34. The print head of a dot matrix printer is moved across the length of the platen by a wire, belt, or chain that is connected to which of the following devices?

1. Paper motor
2. Platen motor
3. Print head motor
4. Carriage motor

13-35. The daisy wheel printer has which of the following advantages over the dot matrix printer?

1. It prints letter quality
2. It can print carbon copies
3. Both 1 and 2 above
4. It prints faster than a dot matrix printer

13-36. The laser printer is what type of printer?

1. Electrostatic
2. Electrosensitive
3. Electrothermal
4. Impact

13-37. Laser printers are classified as which of the following class of printer?

1. Character printer
2. Line printer
3. Daisy printer
4. Page printer

13-38. The photosensitive aluminum cylinder in a laser printer is the

1. primary corona
2. laser source
3. toner drum
4. print drum

13-39. The laser diode generates a single wavelength light in bursts of one millionth of a second or less.

1. True
2. False

13-40. The erase lamps have which of the following effects on the print drum?

1. They apply a positive charge to the drum
2. They apply a negative charge to the drum
3. They neutralize any charge on the drum
4. They neutralize any toner on the drum

13-41. During a laser printer's print cycle, a charge of -600V is applied to the print drum by which of the following devices?

1. Erase lamps
2. Primary corona wire
3. Secondary corona wire
4. Laser beam

13-42. The laser beam's horizontal scan across the drum is developed by which of the following devices?

1. Rotating hexagon mirror
2. Laser diode carriage motor
3. Laser beam lens assembly
4. Laser beam shutter

13-43. What effect, if any, does the laser beam striking the print drum have on the print drum?

1. The area of the print drum becomes positively charged
2. The area of the print drum becomes negatively charged
3. Any charge on the print drum becomes neutralized
4. None; the laser beam has no effect on the print drum

13-44. The toner used in a laser printer consists of a fine powder containing metal, dyes, and

1. ink
2. sand
3. glass
4. plastic

13-45. As the print drum rotates past the toner reservoir, which of the following events occurs?

1. The excess toner on the drum is deposited into the reservoir
2. The toner is attracted to the positively charged areas of the drum
3. The toner is attracted to the negatively charged areas of the drum
4. The toner coats the entire drum

13-46. The transfer corona is used for which of the following functions?

1. It charges the toner to enable the toner to be transferred from the reservoir to the drum
2. It charges the drum to enable the toner to be transferred from the reservoir to the drum
3. It charges the drum to enable the transfer of toner from the drum to the paper
4. It charges the paper to enable the transfer of toner from the drum to the paper

13-47. The toner is permanently bonded to the paper by which of the following means?

1. The registration rollers apply pressure to the paper
2. The fusing rollers apply heat and pressure to the paper
3. The transfer corona applies heat to the paper
4. The primary corona applies heat to the paper

13-48. A laser printer that produces a printout with blotches evenly spaced every 1.75 inches is probably caused by a defect in which of the following components?

1. Upper registration roller
2. Lower registration roller
3. Transfer roller
4. Lower fusing roller

13-49. A laser printer with a scratched print drum can be repaired by performing which of the following actions?

1. Remove the print drum and polish the scratch out
2. Replace the print drum only
3. Replace the cartridge
4. Replace the laser diode

13-50. To print a font using a Hewlett-Packard or compatible laser printer, the font definition bit map provides the printer with which of the following information?

1. Whereto place the dots to print the characters
2. Whereon the page the character is to be printed
3. Whereon a line the character is to printed
4. Whereon the page to print graphic pictures only

13-51. Soft fonts are font bit maps that are handled in which of the following ways?

1. They are loaded into the computer's memory and transferred to the printer when needed
2. They are resident in the printer's ROM
3. They are contained in ROM cartridges that plug into the computer
4. They are contained in RAM cartridges that plug into the printer

13-52. PostScript® printers are capable of printing a typeface in different sizes by using which of the following methods?

1. A different bit map for each size of character to be printed
2. A mathematical definition for each typeface and mathematically scaling the characters to the desired size
3. A mathematical definition for each size character
4. A bit map for one typeface that is mathematically scaled to change the size

13-53. Electrothermal printers use the heat of wires or pins to burn images onto plain paper.

1. True
2. False

13-54. Ink jet printers form images on the paper by which of the following methods?

1. Spraying ink on the paper through a stencil to form the character
2. Spraying ink on the paper with the print head moving to form each character
3. Spraying ink on the paper in a series of dots to form the characters similar to a dot matrix printer
4. Electrostatically charging the paper to attract the ink to the proper position to form the character

13-55. The ink in an ink jet printer is sprayed onto the paper by which of the following methods?

1. By using a pneumatic pump
2. By using piezoelectric crystals to squeeze a nozzle tube
3. By using small heaters to expand an air bubble and force the ink out of the nozzle
4. Either 2 or 3 above, depending on the printer

13-56. An analog signal has which of the following characteristics?

1. It varies continuously with time
2. Each bit position represents a portion of the overall quantity
3. The codes of ONES and ZEROS indicate a value at a particular instant of time
4. The summation of the set bits is normally the quantity to be represented

13-57. Analog signals representing analog quantities and binary numbers representing digital quantities have which of the following characteristics in common?

1. They both vary continuously with time
2. They both can express an infinitely large quantity
3. They both express values As a summation of set bits
4. They both express values within a given set of limits

IN ANSWERING QUESTIONS 13-58 THROUGH 13-60, REFER TO FIGURE 13-1 ON PAGE 13-2 OF THE TEXT.

13-58. To indicate a range of values of 10 miles, what would the amplitude of the analog signal be in volts peak to peak?

1. 7
2. 11
3. 12
4. 20

13-59. What would the digital quantity bit pattern contain to indicate a range of 12 miles?

1. 00011
2. 01100
3. 10010
4. 11000

13-60. To indicate a range of 25 miles, the analog signal will be what number of (a) volts peak to peak while the digital quantity bit pattern will contain what (b) bit pattern?

1. (a) 25 (b) 11001
2. (a) 25 (b) 11100
3. (a) 27 (b) 11001
4. (a) 27 (b) 11100

13-61. The reference signal for an analog to digital conversion is normally equal to which of the following values?

1. The average value of the analog signal
2. The minimum value of the analog signal
3. The maximum value of the analog signal
4. The maximum value of the transmitted data

13-62. In which of the following conversion operations is the input analog signal tested repeatedly over a period of time?

1. Encoding
2. Sampling
3. Decoding
4. Quantization

13-63. Which of the following conversion operations reduces the result of the conversion to a binary code acceptable to digital equipments?

1. Encoding
2. Sampling
3. Decoding
4. Quantization

13-64. Which of the following conversion operations rounds out the conversion to the value of the LSB?

1. Encoding
2. Sampling
3. Decoding
4. Quantization

13-65. Which of the following conversion operations is performed only when a conversion is required?

1. Encoding
2. Sampling
3. Decoding
4. Quantization

13-66. In natural binary code, which of the following bit positions has the greatest weight or represents the largest value?

1. BAM
2. LSB
3. MSB

13-67. Binary angular measurement uses what binary code?

1. Natural binary code
2. Hexadecimal
3. Gray code
4. BCD

13-68. BAM data words are designed to indicate what maximum number of degrees of angular measurement?

1. 45
2. 90
3. 180
4. 360

13-69. When only the MSB of a BAM word used to transmit anon-angular value is set, what is the quantity indicated?

1. The minimum value that can be transmitted
2. The maximum value that can be transmitted
3. One half of the minimum value that can be transmitted
4. One half of the maximum value that can be transmitted

13-70. Binary-coded decimal uses what total number of bit positions to represent a single decimal digit?

1. One
2. Two
3. Eight
4. Four

13-71. Which of the following binary codes is designed to change from one value to the next with only one bit change?

1. Hexadecimal
2. BCD
3. Gray code
4. Natural binary code

13-72. A torque system has which of the following characteristics?

1. It provides a turning force to drive light loads
2. It provides an electrical output used to control the power that performs mechanical work
3. It is the combination of a synchro transmitter and Synchro receivers
4. It is a variety of rotary, electromechanical, position sensing devices

13-73. A synchro system has which of the following characteristics ?

1. It provides a turning force to drive light loads
2. It provides an electrical output used to control the power that performs mechanical work
3. It is the combination of a synchro transmitter and synchro receivers
4. It is a variety of rotary, electromechanical, position sensing devices

13-74. Which of the following is the primary characteristic of a control synchro system?

1. It provides a turning force to drive light loads
2. It provides an electrical output used to control the power that performs mechanical work
3. It is the combination of a synchro transmitter and synchro receivers
4. It is a variety of rotary, electromechanical, position sensing devices

13-75. The term synchro has which of the following meanings?

1. It provides a turning force to drive light loads
2. It provides an electrical output used to control the power that performs mechanical work
3. It is the combination of a synchro transmitter and synchro receivers
4. It is a variety of rotary, electromechanical, position sensing devices

ASSIGNMENT 14

Textbook Assignment: "Data Conversion Devices and Switchboards," chapter 13—continued, pages 13-5 through 13-41.

IN ANSWERING QUESTIONS 14-1 THROUGH 14-4, SELECT FROM THE FOLLOWING LIST THE SYNCHRO SYSTEM DESCRIBED BY THE QUESTION. ANSWERS MAY BE USED MORE THAN ONCE.

1. Single-speed synchro
2. Multispeed synchro
3. Dual-speed synchro

14-1. Allows for a coarse value and a fine value to be sent at the same time.

14-2. Uses more than one speed of data transmission.

14-3. Uses a single synchro transmitter to transmit the entire range of data.

14-4. Is the least accurate synchro system.

14-5. In a dual-speed synchro system, which of the following values is/are sent by the synchro with (a) the highest ratio and (b) the lowest ratio?

1. (a) Coarse only
   (b) Fine only
2. (a) Fine only
   (b) Coarse only
3. (a) Coarse only
   (b) Fine and coarse
4. (a) Fine and coarse
   (b) Fine and coarse

14-6. At any instant in time, the amplitude and polarity of the stator voltages, when compared to the supply or reference voltage, indicate the angular position of the rotor.

1. True
2. False

14-7. The sector conversion method divides the 360° of rotation into what total number of sectors?

1. 6
2. 8
3. 45
4. 60

IN ANSWERING QUESTIONS 14-8 AND 14-9, REFER TO TABLE 13-2 ON PAGE 13-7 OF THE TEXT.

14-8. When the stator voltages S1 and S3 are in phase with the reference and S2 is out of phase, what sector is selected?

1. 30° to 90°
2. 90° to 150°
3. 150° to 210°
4. 330° to 30°

14-9. When the stator voltages S1 and S2 are in phase with the reference and S3 is out of phase, what sector is selected?

1. 30° to 90°
2. 90° to 150°
3. 150° to 210°
4. 270° to 330°

14-10. What is the total number of stator voltages required to determine the ratio angle once the sector has been determined?

1. One
2. Two
3. Three
4. Four

14-11. During the octant conversion process, the 45-degree octant is determined by which of the following means?

1. The polarity and amplitude of two of the stator voltages
2. The polarity and amplitude of the sine and cosine voltages
3. The phase difference between two of the stator voltages
4. The phase difference between the sine and cosine voltages

14-12. Once the octant has been determined during the octant conversion process, the remaining bit positions of the BAM word are determined by a trial and error approximation of a test binary angle against a ratio angle.

1. True
2. False

14-13. What total number of synchro-to-digital conversions are required to generate a single BAM word from a dual-speed synchro input?

1. One
2. Two
3. Eight
4. Four

14-14. Linear signals normally represent a quantity based on which of the following characteristics?

1. Signal amplitude
2. Signal frequency
3. Signal phase relationship
4. All of the above

14-15. Scalar or resolver outputs are comprised of which of the following signals?

1. A single linear waveform
2. A single waveform representing the sine of an angle
3. A single waveform representing the cosine of an angle
4. Two waveforms representing the sine and cosine of an angle

14-16. The binary input to digital-to-analog converters is normally in which of the following binary forms?

1. Binary-coded decimal
2. Gray code
3. Binary angular measurement word
4. Natural binary

14-17. A single digital-to-analog converter outputs what maximum number of proportional voltage signals?

1. One
2. Two
3. Three
4. Four

14-18. What maximum number of DACs can be mounted on a mounting base?

1. One
2. Two
3. Three
4. Four

14-19. Which of the following functions is performed by the BASE?

1. Selects the DAC operating mode
2. Provides all electrical interfaces for the DACs
3. Provides simulated digital data for test purposes
4. Each of the above

14-20. Each channel of a DAC can output which of the following signals?

1. Two linear voltages
2. A single-speed synchro
3. A sine/cosine resolver
4. Each of the above, depending on the operational mode selected

14-21. Which of the following functions is NOT performed by the EF and control address words?

1. Master clear the DAC
2. Initiate RDUC operations
3. Set the individual DAC's control address
4. Define the control address of the DAC to receive the data words

14-22. What is the maximum number of data words that can be sent in an output buffer to the DAC/BASE?

1. 8
2. 10
3. 12
4. 16

14-23. Individual DAC channels are identified by what code?

1. The A channel code
2. The B channel code
3. The data address code
4. The control address code

IN ANSWERING QUESTIONS 14-24 THROUGH 14-27, SELECT FROM THE FOLLOWING LIST THE FUNCTIONAL SECTION OF THE DAC FUNCTION DESCRIBED IN THE QUESTION. ANSWERS MAY BE USED MORE THAN ONCE.

1. Analog section
2. Digital section
3. Power supply section

14-24. Generates the ODR signal to the computer to start the data word processing.

14-25. Contains resistive ladder networks.

14-26. Provides five regulated dc voltages.

14-27. Converts the output of the holding registers to proportional voltages.

14-28. Which of the following DAC sub-channels outputs the SINE waveform when in the TRIG mode?

1. A
2. B
3. Al
4. A2

14-29. Which of the following DAC sub-channels outputs linear waveforms when in the LINEAR mode?

1. A
2. Al only
3. A2 only
4. Al and A2

14-30. Which of the following BASE controls allows for the selection of simulated test data from the BASE switches?

1. Mode control
2. Digital input
3. Channel A mode
4. Channel A data address

14-31. The selection of synchro or resolver output is performed by which of the following DAC/BASE controls?

1. Mode control only
2. Channel A mode only
3. Both mode control and channel A mode are required
4. Channel A data address

14-32. The digital-to-synchro converter in the DAC converts BAM data words to which of the following types of outputs?

1. Linear voltages
2. Sine and cosine voltages
3. Dual-speed synchro signals
4. Single-speed synchro signals

14-33. The KCMX can accept demand digital from what maximum number of devices?

1. 8
2. 16
3. 24
4. 32

14-34. Multiplexing data converters allow the CDS computer to communicate with a variety of analog and digital equipments.

1. True
2. False

IN ANSWERING QUESTIONS 14-35 THROUGH 14-37, SELECT FROM THE FOLLOWING LIST THE DEMAND DIGITAL CONTROL SIGNAL FOR THE FUNCTION DESCRIBED IN THE QUESTION. NOT ALL ANSWERS ARE USED.

1. Enter signal
2. Read signal
3. Error signal
4. Demand digital interrupt

14-35. A program controlled function signal.

14-36. Generated when a data entry device has input ready for transmission to the controlling computer.

14-37. Activates the DD device data lines.

14-38. The KCMX can accept ready digital data from what maximum number of inputs?

1. 8
2. 16
3. 24
4. 32

14-39. The KCMX is capable of communicating with digital devices over what total number of DIC/DOC channels?

1. One
2. Two
3. Three
4. Four

14-40. The KCMX can receive what maximum number of status signals?

1. 60
2. 45
3. 30
4. 15

14-41. On KCMX ready analog inputs, which of the following types of conversion is performed?

1. Digital-to-linear
2. Digital-to-synchro
3. Linear-to-digital
4. Synchro-to-digital

14-42. The KCMX uses what maximum number of reference voltages to perform synchro-to-digital conversions on ready analog inputs?

1. 8
2. 12
3. 16
4. 20

14-43. The computer input data register is located on which of the following KCMX panels?

1. Al
2. A2
3. A3
4. A4

14-44. The DD/DDI select ON/OFF switches on the KCMX perform which of the following functions?

1. They identify the group mode
2. They indicate if an ENTER signal is on the line
3. They enable or disable the individual device DDI enter signals
4. All of the above

14-45. Which of the following KCMX controls/ indicators indicates the status of individual external signals?

1. Data register
2. Output register
3. Control output register
4. Computer input data register

14-46. DOC equipment output data maybe viewed using which of the following registers?

1. Data register
2. Output register
3. Control output register
4. Computer input data register

14-47. Which of the following duplex controls/ indicators are lighted to indicate that computer A is in control of the KCMX and has received an input data request from computer A?

1. The A ODR only
2. The A IDR only
3. The A IN CONTROL only
4. Both the A IDR and the A IN CONTROL

14-48. Which of the following MODE SELECT switch positions enables the KCMX to simulate computer operations by use of the front panel controls?

1. DOC
2. MANUAL
3. NORM
4. A/D CONV

14-49. Which of the following KCMX pushbuttons is used to reset all logic circuits?

1. BFE
2. DATA
3. MASTER CLEAR
4. ADDRESS CLEAR

14-50. Which of the following KCMX indicators may be used to display the starting address of a set of addresses to be interrogated in test mode?

1. INTERRUPTS
2. FINAL ADDRESS
3. ADDRESS CLEAR
4. CURRENT ADDRESS

14-51. Which of the following operations is indicated by a lighted CONTROL CHANNEL indicator?

1. A simulated DOC input
2. An external function
3. The KCMX is in test mode
4. A control word transfer

14-52. When address 77 is detected in the FINAL ADDRESS, which of the following interrupt indicators is lighted?

1. ID ERR
2. DIC REQ
3. ILL ADR
4. Each of the above

14-53. When the KCMX has granted control to computer A or B, which of the following KCMX indicators is lighted?

1. DATA
2. INCONTROL
3. EOC ENABLE
4. COMPUTER ACKNOWLEDGE

14-54. When in the DIC computer mode, the DIC channel EF/INT and OA/IDR indicators light for interrupts and input data requests.

1. True
2. False

14-55. Which of the following positions should the SELECTOR switch be in to simulate a 120-degree angle?

1. 1
2. 2
3. 3
4. 4

14-56. On digital switchboards, what is the minimum number of manual switches required for each I/O device or computer channel?

1. One
2. Two
3. Three
4. Four

14-57. Control signals used to initiate switching action are generated by which of the following devices?

1. DFCS only
2. CSCP only
3. Both DFCS and CSCP

14-58. Each DFCS section contains what maximum number of switch panels?

1. 12
2. 18
3. 24
4. 32

14-59. Linear movement switch panels contain assemblies that can be switched to which of the following number of positions?

1. Six
2. Five only
3. Three only
4. Either three or five, depending on the type of assembly

14-60. The switch control and potential transformer ACO assembly is used to provide voltages for bench testing which of the following DFCS panels?

1. Relay tester assemblies
2. Power distribution panels
3. Linear movement switches
4. All of the above

14-61. What color CSCP pushbutton/indicator (PBI) will be lighted when the associated DFCS linear slide switch is in the ALTERNATE position?

1. Red
2. White
3. Green
4. Yellow

14-62. What color CSCP PBI will be lighted when the associated DFCS linear slide switch is in the OFF position?

1. Red
2. White
3. Green
4. Yellow

14-63. The DFCS can be controlled from two or more CSCPs at the same time.

1. True
2. False

14-64. Ship's cables are identified by which of the following markings?

1. Wire number
2. Cable type only
3. Cable group number only
4. Cable type and group number

14-65. A ship's wire has a plastic number with the following markings **"65 PD 632."** The number 632 indicates what designation?

1. Cable number
2. Function number
3. Circuit designator
4. Assigned wire number

14-66. Which of the following designations could be used to identify a CSCP 85-pin connector?

1. JA
2. JB
3. JK
4. JP

14-67. Each analog switchboard section contains what maximum number of panels?

1. 2
2. 12
3. 24
4. 36

IN ANSWERING QUESTIONS 14-68 THROUGH 14-72, SELECT FROM THE FOLLOWING LIST THE ANALOG SWITCHBOARD PANEL WHOSE FUNCTION IS DESCRIBED IN THE QUESTION. ANSWERS MAY BE USED MORE THAN ONCE.

1. Indicator panel assembly
2. Fuse panel assembly
3. Meter panel assembly
4. Flasher panel assembly

14-68. Contains overflow fuses for associated switch panels.

14-69. Monitors ac or dc power busses.

14-70. Uses a motor driven cam to open or close control or status signal circuits.

14-71. Provides a visual indication of the active power being supplied to the switchboard.

14-72. Indicates a warning or emergency condition.

14-73. Which of the following switch panels are used to connect shipboard power supplies to the switchboard power busses?

1. Snap switches
2. Linear slide switches
3. Manually operated JR switches
4. Remotely operated JR switches

14-74. What type of switches are found in a remotely operated JR switch assembly?

1. JR
2. AJR
3. Snap
4. Linear movement

14-75. When a control signal is fed back to the KCMX as a status signal input by the switchboard for test purposes, the switchboard is in which of the following configurations?

1. OFF
2. EAT
3. NORMAL
4. ALTERNATE

STUDENT COMMENT SHEET

THIS FORM MAY BE USED TO SUGGEST IMPROVEMENTS, REPORT COURSE ERRORS, OR TO REQUEST HELP IF YOU HAVE DIFFICULTY COMPLETING THE COURSE.

NOTE: IF YOU HAVE NO COMMENTS, YOU DO NOT HAVE TO SUBMIT THIS FORM.

Date_____

FROM:

_____
RATE/RANK/GRADE, NAME (FIRST, M.I., LAST)

_____
STREET ADDRESS, APT #

_____
CITY, STATE, ZIP CODE

DSN:_____
Commercial:_____
FAX:_____
INTERNET:_____

To: COMMANDING OFFICER
NETPMSA CODE N315
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

Subj: ELECTRONICS TECHNICIAN—VOLUME 6, DIGITAL DATA SYSTEMS, NAVEDTRA 82416-A

1. The following comments are hereby submitted:

PRIVACY ACT STATEMENT

UNDER AUTHORITY OF TITLE 5, USC 301, INFORMATION REGARDING YOUR MILITARY STATUS IS REQUESTED TO ASSIST IN PROCESSING YOUR COMMENTS AND IN PREPARING A REPLY. THIS INFORMATION WILL NOT BE DIVULGED WITHOUT WRITTEN AUTHORIZATION TO ANYONE OTHER THAN THOSE WITHIN DOD FOR OFFICIAL USE IN DETERMINING PERFORMANCE.

.....(Fold along dotted line .....

.....(Fold along dotted line).....

DEPARTMENT OF THE NAVY

COMMANDING OFFICER
NETPDTC CODE N315
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

OFFICIAL BUSINESS

COMMANDING OFFICER
NETPDTC CODE N315
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

NAVEDTRA 1430/5
Stock Ordering No. 0502-LP-216-0100

PRINT OR TYPE

TITLE_____ NAVEDTRA_____

NAME_____ ADDRESS_____
Last First Middle Street/Ship/Unit/Division, etc.

_____
City or FPO State Zip

RANK/RATE_____ SSN_____ DESIGNATOR_____ ASSIGNMENT NO._____ DATE SUBMITTED _____

☐ USN ☐ USNR ☐ ACTIVE ☐ INACTIVE OTHER (Specify)_____

SCORE

	1 T	2 F	3	4			1 T	2 F	3	4			1 T	2 F	3	4	
1	☐	☐	☐	☐	_____	26	☐	☐	☐	☐	_____	51	☐	☐	☐	☐	_____
2	☐	☐	☐	☐	_____	27	☐	☐	☐	☐	_____	52	☐	☐	☐	☐	_____
3	☐	☐	☐	☐	_____	28	☐	☐	☐	☐	_____	53	☐	☐	☐	☐	_____
4	☐	☐	☐	☐	_____	29	☐	☐	☐	☐	_____	54	☐	☐	☐	☐	_____
5	☐	☐	☐	☐	_____	30	☐	☐	☐	☐	_____	55	☐	☐	☐	☐	_____
6	☐	☐	☐	☐	_____	31	☐	☐	☐	☐	_____	56	☐	☐	☐	☐	_____
7	☐	☐	☐	☐	_____	32	☐	☐	☐	☐	_____	57	☐	☐	☐	☐	_____
8	☐	☐	☐	☐	_____	33	☐	☐	☐	☐	_____	58	☐	☐	☐	☐	_____
9	☐	☐	☐	☐	_____	34	☐	☐	☐	☐	_____	59	☐	☐	☐	☐	_____
10	☐	☐	☐	☐	_____	35	☐	☐	☐	☐	_____	60	☐	☐	☐	☐	_____
11	☐	☐	☐	☐	_____	36	☐	☐	☐	☐	_____	61	☐	☐	☐	☐	_____
12	☐	☐	☐	☐	_____	37	☐	☐	☐	☐	_____	62	☐	☐	☐	☐	_____
13	☐	☐	☐	☐	_____	38	☐	☐	☐	☐	_____	63	☐	☐	☐	☐	_____
14	☐	☐	☐	☐	_____	39	☐	☐	☐	☐	_____	64	☐	☐	☐	☐	_____
15	☐	☐	☐	☐	_____	40	☐	☐	☐	☐	_____	65	☐	☐	☐	☐	_____
16	☐	☐	☐	☐	_____	41	☐	☐	☐	☐	_____	66	☐	☐	☐	☐	_____
17	☐	☐	☐	☐	_____	42	☐	☐	☐	☐	_____	67	☐	☐	☐	☐	_____
18	☐	☐	☐	☐	_____	43	☐	☐	☐	☐	_____	68	☐	☐	☐	☐	_____
19	☐	☐	☐	☐	_____	44	☐	☐	☐	☐	_____	69	☐	☐	☐	☐	_____
20	☐	☐	☐	☐	_____	45	☐	☐	☐	☐	_____	70	☐	☐	☐	☐	_____
21	☐	☐	☐	☐	_____	46	☐	☐	☐	☐	_____	71	☐	☐	☐	☐	_____
22	☐	☐	☐	☐	_____	47	☐	☐	☐	☐	_____	72	☐	☐	☐	☐	_____
23	☐	☐	☐	☐	_____	48	☐	☐	☐	☐	_____	73	☐	☐	☐	☐	_____
24	☐	☐	☐	☐	_____	49	☐	☐	☐	☐	_____	74	☐	☐	☐	☐	_____
25	☐	☐	☐	☐	_____	50	☐	☐	☐	☐	_____	75	☐	☐	☐	☐	_____

THIS FORM MAY BE LOCALLY REPRODUCED